OOD MANUFACTURE

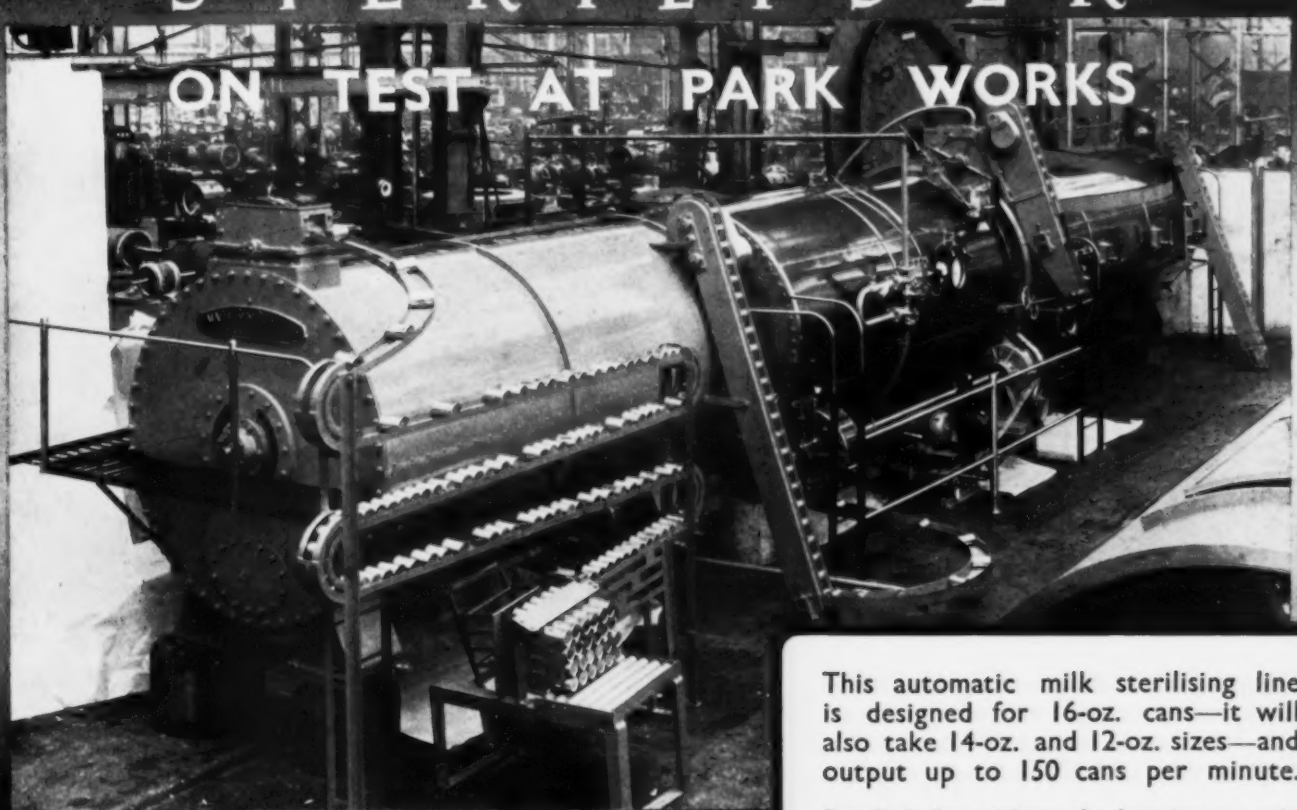
FOOD MANUFACTURE

ISHERS: LEONARD HILL LIMITED, 17, STRATFORD PLACE, LONDON, W. 1 APRIL, 19

ANOTHER *HIGH SPEED* CONTINUOUS

STERILISER

ON TEST AT PARK WORKS



This automatic milk sterilising line is designed for 16-oz. cans—it will also take 14-oz. and 12-oz. sizes—and output up to 150 cans per minute.

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A JOURNAL DEVOTED TO THE PRODUCTION AND MANUFACTURE OF ALL EDIBLE COMMODITIES INVOLVING A PROCESS OF MANUFACTURE.

FOOD MANUFACTURE

Incorporating Canning, Packing and Preserving.

VOLUME . . . XIV

NUMBER . . . 4

APRIL . 1939

Fuel & Power Number

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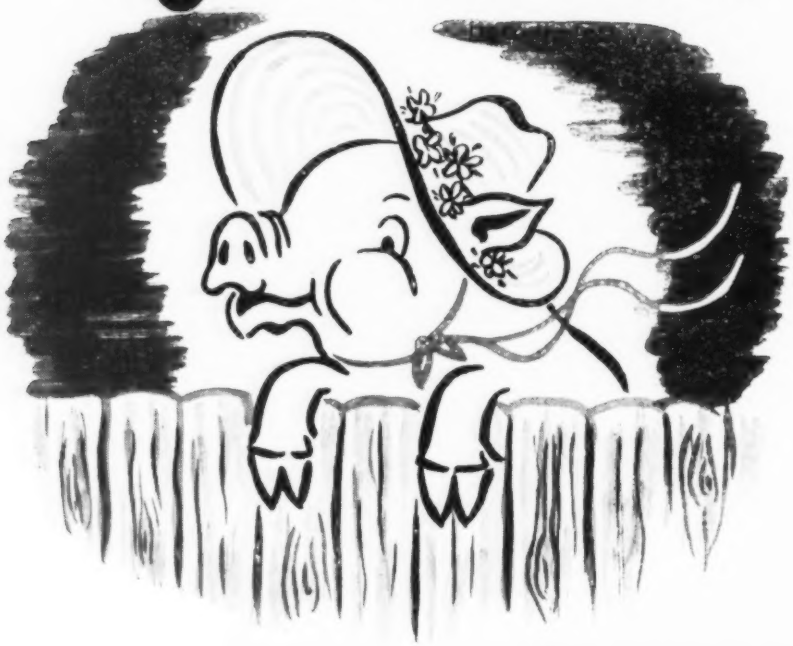
The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

Never buy a Pig in a Poke



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FOOD MANUFACTURE

Vol. XIV, No. 4 April, 1939

What's in a Name?

IN THE House of Commons recently Sir P. Hurd asked the Minister of Agriculture whether he was aware of the practice of selling imported frozen pig meat as British bacon after curing in this country, and whether steps could be taken to ensure that only pigs which are bred, fed and cured here shall be retailed as British bacon.

The Minister of Pensions, Mr. Ramsbotham, replied on behalf of the Minister of Agriculture, and agreed that substantial quantities of frozen pork, imported largely from the Dominions, are cured in this country and sold as "home cured". He did not think that it was the practice, however, to sell this bacon as British. There is obviously a quibble about this. If a person sees bacon exposed for sale as "home cured" the obvious view of the average purchaser would be that it was British bacon.

There are very strange things permitted in the nomenclature of our foodstuffs. How much Cheddar cheese comes from Cheddar, and how much Wiltshire bacon has ever seen Wiltshire? In the latter case the word Wiltshire refers to a method of curing rather than a place of origin. It is all very confusing to the average purchaser, and we feel that the powers conferred by the Merchandise Marks Act could be used more fully to safeguard people in these vague and anomalous descriptions.

Help for Agriculture

The new Minister of Agriculture has started well and some of his earliest efforts are being highly praised by farmers.

Wheat growing, or to be more accurate, the receipt of wheat quota payments, will no longer debar the oat and barley grower from assistance. At last the Government has recognised that these crops are complementary, not alternative. Sir Reginald Dorman-Smith in a short month has, by obtaining this recognition, done much more for cereal farmers than either of his immediate predecessors managed to achieve.

When the oats and barley subsidy was first announced we pointed out the unfairness of the clause which prevented any farmer receiving wheat quota payments from participating. It was of little use last December for the Government to increase the subsidy from 10s. to £1 per acre, as so few farmers could really benefit. As we have repeatedly pointed out, our farmers have had a bad time and a raw deal from the Government and were getting very restive.

This early gesture of the Minister has produced an immediate and important reaction, especially as he has indicated that the payments will be retrospective. Those farmers who have already applied know how they stand in respect of oats and barley.

It seems also likely that it is intended to give those who have plumped for wheat an opportunity of applying for help in the other cereals they grew last year.

Wheat Act Amendments

The Wheat Act of 1932 has done much to maintain wheat-growing in this country. Without it English wheat farmers would most certainly have been ruined. There are some classes of European wheat, quite as good if not better than English, that can be bought at 17s. per quarter, and no one would suggest that English wheat could be grown at that price. Valuable as was the measure, there were certain unforeseen anomalies, and loopholes were discovered which made the evasion of quota payment possible in certain circumstances.

The Wheat (Amendment) Bill, introduced a short time ago contains provisions to bring the standard price under review every three years. A committee will recommend to the Minister of Agriculture any change which may be desirable in the

standard price of 45s. per quarter laid down in the 1932 Act. It seems reasonable to have powers to vary the standard price with the costs of production, and once in three years seems likely to strike an equitable average.

Other clauses deal with the definition of flour, which is to be subject to the quota payments which provide the Wheat Commission's income. The Government, wisely profiting by the Paul lawsuit which eventually ended against the Commission in the House of Lords, have this time consulted a committee of the leading cereal chemists in the country with a view to arriving at definitions and methods of analysis. After a number of meetings a unanimous report was submitted to the commission, and it is very unlikely that any evasion will now be possible. On the other hand, such products as flaked or rolled wheat, etc., which are destined for livestock, will be free from quota payment. On the whole the new Act should benefit the wheat-grower without inflicting any hardship on the stockbreeder.

A Curious Case

A recent action in the King's Bench division, where a grocer and a firm of marmalade manufacturers were sued, opened up some curious points. The plaintiff said she bought a pot of marmalade on the assurance of the grocer that it was really good. While eating a slice of bread and butter on which the marmalade had been spread, she felt something in her throat, and examination showed that she had swallowed fibre or similar matter which, it was alleged, was in the pot of marmalade. She was sick, and had to have prolonged medical treatment and lost weight and got dermatitis.

Lord Justice du Parcq said he had no doubt that the grocer warranted that the marmalade was reasonably fit for the purpose for which it was intended, but that it was not so because it had some strands of jute fibre in it. We would point out, however, that it was never proved that the jute fibre was in the marmalade. It might just as well have been in the piece of bread. Flour is stored and conveyed in jute sacks, and it seems far more likely that the jute would come from the flour sack rather than the marmalade, in the manufacture of which no such sacks are used.

The judge ruled that the jute did not cause the plaintiff more than coughing and spluttering. He, therefore, held that she failed as far as the manufacturers were concerned, but he gave her nominal damages against the grocer of 40s. for breach of warranty.

The whole case was unsatisfactory, and certainly no proof appears to have been supplied that the fibre was in the marmalade rather than the bread.

Window-Dressing

Sir P. Hurd has been very active recently and has asked the Minister of Agriculture several leading questions. One was whether the Minister was aware that New Zealand spends £30,000 and Argentina £40,000 a year to advertise their food products, as marketed in this country under State control, and whether, seeing the success of this form of publicity, he would co-operate with British producers and traders, possibly on the £ for £ basis, for the advertising of properly graded British produce.

The Minister's reply was guarded: "Although I have no precise information on the subject, I am aware that considerable sums are spent for the purposes mentioned. Steps are already taken to advertise British produce that has been graded under the various National Mark Schemes, and, while sums available for this purpose are limited, I shall be happy to consider any suggestions for further co-operation."

This sounds plausible, but it does not answer the question. Why should public funds be spent only via the National Mark Schemes, when part of these funds, at any rate, is provided by people who are not interested in National Mark Schemes. While we agree that some of the National Marks are valuable, we feel that others are useless—flour, for example—and in any case the National Mark only covers part of the ground.

If we are going in for window-dressing let us do it thoroughly and make more use of the B.I.F., or even resurrect the Empire Marketing Board.

American Canning

There may be something to be said against, but much to be said in favour of the study of other people's troubles. This thought comes to us as we read the proceedings of the National Canners Association's Convention at Chicago.

Dr. Neil Carothers presented the dark side of the picture at the beginning of an address given at one of the early sessions. He pointed out dangers and problems ahead, which were many and varied: railways in a most unhappy and depressed condition; agriculture an "unsolvable

problem"; labour sitting tense and uncertain; currency in a state of chaos; and, remotely in the future, the possibility of a calamitous inflation.

Later he struck a more optimistic note, predicting for the coming year better conditions than last year. Dr. Carothers said that by this he did not mean that it would necessarily be better for the canning industry. He pointed out that the economists did not necessarily see the situation eye to eye with the business men, who looked upon their own businesses as a part of the general business situation.

The canning industry was a new industry. Its technical development and progress was one of the wonders of a wondrous age. But it had not had time to study its own practices, one result of which had been that it worked in a jungle of competition. Many of the problems confronting the canners had been depression problems, but many had also been internal ones, individual and peculiar to the industry itself.

Dr. Carothers suggested various ways of solving these problems. One way was to let nature take its course, each member of the industry fighting his way as best he can and letting the devil take the hindmost. In this way, after a while the survivors would probably establish some sort of stability. But economic history shows that this dog-eat-dog method does not always work out. Another method was to find out, if possible, just what was wrong with the industry. This brings in the matter of research. Apart from the technical sort, there is a special type of research—a one-time survey of the whole industry. This survey would examine its practices, its methods, its competition conditions, its finances, its credit methods, its distribution methods, its markets, and its probable future.

The first question that presents itself is: What will such a research reveal? That, of course, nobody knows. If they did, there would be no need for a research survey.

If a research survey should disclose certain weaknesses or undesirable trade practices or unfair competition it would not necessarily involve any disruption in the industry. On the other hand, such a project might develop highly constructive and progressive changes. It might point out economies for the whole industry. Finally it might find very little on which to base definite and vital changes of policy. Even in that unlikely event it would be worth while. For it would tell that there is not under present circumstances any possibility of finding out what is wrong with the canning industry. Or it would tell that there is nothing wrong. In either event it would tell canners where they stood.

As we said at first—other people's troubles. Is the way they are trying to overcome them any use on our side? *Verb. sap.*

Humour at Chicago

As will be realised from what is written in another part of this issue, they do things very well at the Chicago Canners' Conference. Interpolated between the serious papers, they deliberately injected what the President called "something at which we might laugh". They even labelled the address "a serious message with a sauce of humour".

With the British temperament a speech with such a label would probably have an inhibiting effect. However, in the case of Strickland Gillilan's talk, the inhibition would have promptly been dissipated.

Space will permit only of tiny samples, but they will show what we mean. About statistics, he says: "The nicest thing about statistics from the standpoint of economy of intelligence is that you don't have to know anything. You don't even have to suspect anything in order to give statistics till the cows come home, or the bull runs out, whichever happens to come first."

Knowledge is summed up as "necessary, but isn't everything. Among the other bunches of 98 per cent. hooey that was handed us in the old school copybooks was this bromide without a modicum of truth in it: 'Knowledge is power'. That sounds big in an empty barrel. It is a wonderful thing if you don't think. Knowledge is no more power than a pint of gasolene is a truck". Quite a wealth of de-bunking there!

Again, he describes the expert as "an ordinary damn fool away from home". Then follows the old story about the expert, which the speaker suggests is so old that within five years it will be heard on the radio. (So they suffer from that, too, in the States!)

The pill under the covering of humour was uplift. "Patience must not be confused with phlegmatism". In Southern Ohio (where the speaker came from)—"the part of the State where everybody came from that could—if you see a distant object and can't tell from where you are whether it's a stump or a person, watch it. If it moves, it's a stump".

But the whole law and all the prophets is really contained in the phrase, "There is all the difference in the world between an optimist and any year's model or wheelbase of idiot".

Dietetics

That this is a very abstruse subject was made evident by the speeches at a joint meeting of the Food Group of the Society of Chemical Industry and the Society of Public Analysts recently held.

The discussion was on "The Analysis and Differentiation of the Composition of Iron, Phosphorus, and Calcium Compounds in respect of Nutritional Requirements".

Professor J. C. Drummond, speaking on the analytical side, pointed out that the mere determination of the total intake of iron, phosphorus, and calcium was insufficient. The nutritional value of iron in red meat, for example, was very different from that of iron in wheat, and methods of estimating "availability" of the iron had assumed great importance.

The problems arising in connection with phosphorus and calcium were in many respects closely interrelated and had an important bearing on the function of vitamin D.

Dr. McCance pointed out that iron in the ionisable form—*e.g.*, as mineral salts—was utilisable by the animal body to a much greater extent than iron in organic combination in hæmoglobin or hæmatin. He discussed the methods of discrimination between these two forms of compound iron, and was of opinion that the use of tripyridyl was preferable to that of $\alpha\alpha'$-dipyridyl, and that there was room for great improvement in the methods of biological assay used in this work.

Professor Kay pointed out that in certain respects the nutritive values of phosphorus and calcium were interdependent, and that in man about 90 per cent. of the total phosphorus present was in the bones, about 8 per cent. in the muscles, and much smaller quantities in the brain and blood.

The presence of precipitants for phosphates in the food ingested might seriously interfere with absorption of phosphorus.

Recent experiments have spectacularly shown that the ingestion of beryllium carbonate, owing to the practically complete insolubility of beryllium phosphate, prevented absorption of phosphates present in the food almost completely, and so gave rise to rickets, even with normal diets rich in vitamin D.

Professor Kay mentioned a promising method of studying phosphorus absorption and metabolism, based on ingestion of artificially produced radioactive phosphorus of atomic weight 32.

Dr. Robertson, speaking for Professor Dodds and himself, gave details of the analytical methods employed in studying calcium balance in human beings over three-day periods. Factors affecting the calcium absorption, such as the composition of the diet, the effect of hydrochloric acidity, and the presence of certain substances, notably lactose, were briefly discussed.

F.B.I. and Taxation

Being seriously concerned at the continuance of taxation at the present level, the Federation of British Industries has forwarded its views to Sir John Simon. The high rate of taxation itself is a contributory factor in the slowing down in the tempo of domestic activity other than rearmament, and such slowing down in more normal times would justify the suggestion that the present high rate should be reduced.

There is a great need for manufacturers to conserve their resources in order to take advantage of any opportunities which may occur for increasing export trade. The Federation recognises the predominant need for rearmament, and welcomes the introduction of a Bill to increase the Government's powers to borrow, and trusts that this will meet the requirements in excess of the yield of existing taxes.

The Federation also wishes to urge strongly that expenditure on air raid precautions should be more generously treated for taxation purposes. Concessions already announced are not enough.

A deputation representing a large number of important associations waited on the Chancellor recently on the question of double taxation. The Federation represents that the first opportunity should be taken of easing this burden. The effect of double taxation is a hindrance to the expansion of export trade. The Federation urges the Chancellor to use his best endeavours to commence negotiations in the near future.

Digestion

Apropos Dr. Bacharach's suggestion that food chemists are realising that food has to be digested as well as eaten, the Grace during Meat, written by Sir Stephen Gaselee in a recent issue of our contemporary, *Wine and Food*, is apposite and elegant:

> On china blue my lobster red
> Precedes my cutlet brown,
> With which my salad green is sped
> By yellow Chablis down.
>
> Lord, if good living be no sin
> But innocent delight,
> O polarise these hues within
> To one eupeptic white.

CROSSE AND BLACKWELL'S

BERMONDSEY FACTORY

T. CROSBIE-WALSH, F.I.C.

THIS BUSINESS might be described as the apotheosis of the " industrious apprentices ". It is more than one hundred years ago since Thomas Blackwell and Edmund Crosse, who had been schoolfellows, made their way to London to be apprenticed.

Edmund Crosse did not take very long in buying his master out of the business—the year was 1830—and, bringing his friend along with him, founded the present concern.

Records show that fourteen years afterwards, in 1844, the balance sheet of the firm showed the very satisfactory profit of £5,141.

Making History

The archives of Crosse and Blackwell must contain a lot of the history of British food marketing. To a Captain Warren is credited recipes for such specialities as curry powder and mango relish. From Napoleon's celebrated chef, Quallioti, and M. Soyer, were obtained a number of original recipes. The former devised the still popular C. and B. Piccalilli.

Since their incorporation in 1892, Crosse and Blackwell have absorbed Keillers, Lazenbys, Cairns, and are now associated with Chocolate Tobler, thus forming one of the largest food manufacturing and distributing concerns in the world.

The London factory at Crimscott Street, Bermondsey, is a vast one, and it is difficult to say at first sight which impresses more—the magnitude of the operations or the extraordinary efficiency and smoothness with which they are carried out.

Can Making

Crosse and Blackwell make their own cans. A high-speed can-making plant is always a spectacular sight, but a further touch of the picturesque is provided by the constant stream of cans winding their way on conveyors to the different canning sections, horizontally along the parapets or even in a vertical direction down the sides of the walls.

The Tinplate Lacquering Department

The three-zone, 90 ft. long oven has an hourly output of 2,000 sheets of tinplate. Maple wood flooring is employed to eliminate dust contamination, and to this end all air entering the department is conditioned. The distributing duct is placed down the centre of the roof span.

Can Body Maker

The cut blanks of tinplate are automatically fed into the machine, which forms them into cylindrical bodies with strongly hooked seams, which are soldered. Both operations proceed at a speed of 300 cans per minute.

High-Speed Seamer

After the can bodies have been seamed and soldered, the ends are flanged and they pass to this machine for the ends to be double-seamed to the bottoms of the bodies, at a speed of 300 per minute. High-speed units are installed for each size of can manufactured.

One of the outstanding impressions gathered from a walk round the factory is the number of different pro-

Tinplate lacquering department. The three zone, 90 ft. long Ballard oven with an hourly output of 2,000 sheets of tinplate.

ducts being handled. Upwards of 2,000 items are prepared in the Crimscott Street factory. It would be impossible in the course of a single article even to name them all, hence a description will be given ot one or two well-known products.

Soup Making

This is an important item of factory activity and comprises a full range of vegetable, cream, and meat soups. A total of 27 different varieties are packed in tins of sizes ranging from 5 oz. to 1 gallon, and 11 varieties are packed in both tins and bottles.

One large department is specially laid out for dealing with the preparation of fresh vegetables, which are utilised either as garnish or in the manufacture of vegetable purées for soup. Several tons of vegetables are cleaned, cut, and diced daily.

In another section rows of blanching pans are utilised for the preparation of oxtails, kidney, chickens, etc., which are also used as garnish.

The principal soup manufacturing department is equipped with a long row of pure nickel boiling pans, in which the soup is finally cooked. Conveyors bring the cans to the site of the automatic soup filling machinery, from which the cans are conveyed for immediate closing on the high-speed automatic double-seaming machines. The closed cans then travel to the automatic washing machines for the removal of any grease on the outside, and they are then stacked in metal carriers, in which they are loaded into the retorts for sterilisation. Each retort is fitted with time-temperature recording apparatus.

In the manufacturing section, which deals with the production of galantines and meat rolls, it is interesting to note a battery of machines which close the cans *under vacuum*. The employment of such vacuum double-seaming machines eliminates the necessity for any "brogging" of the can during the early stages of the subsequent retorting process.

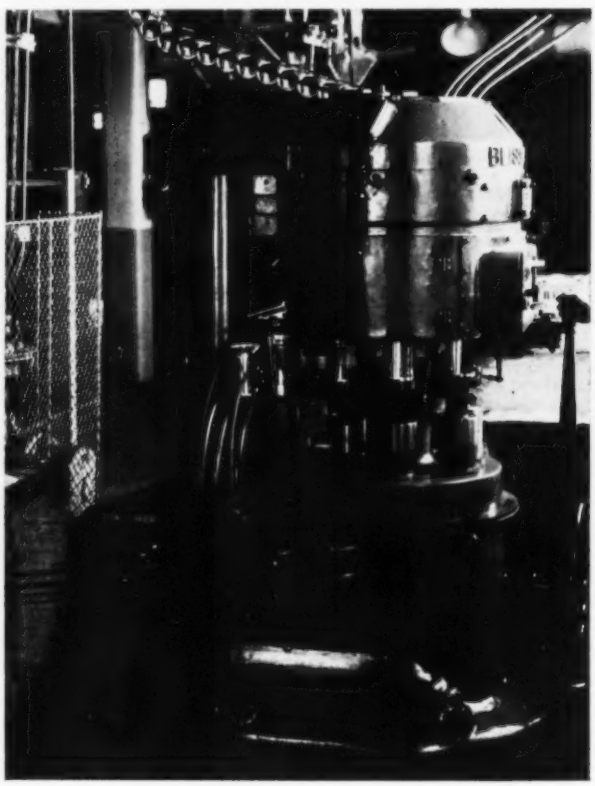
In a further large canning kitchen dealing with the manufacture of meat and vegetable products, the large autoclaves are fitted with cages, which are conveyed by means of an electric hoist running on an overhead runway.

Sauces and Ketchups

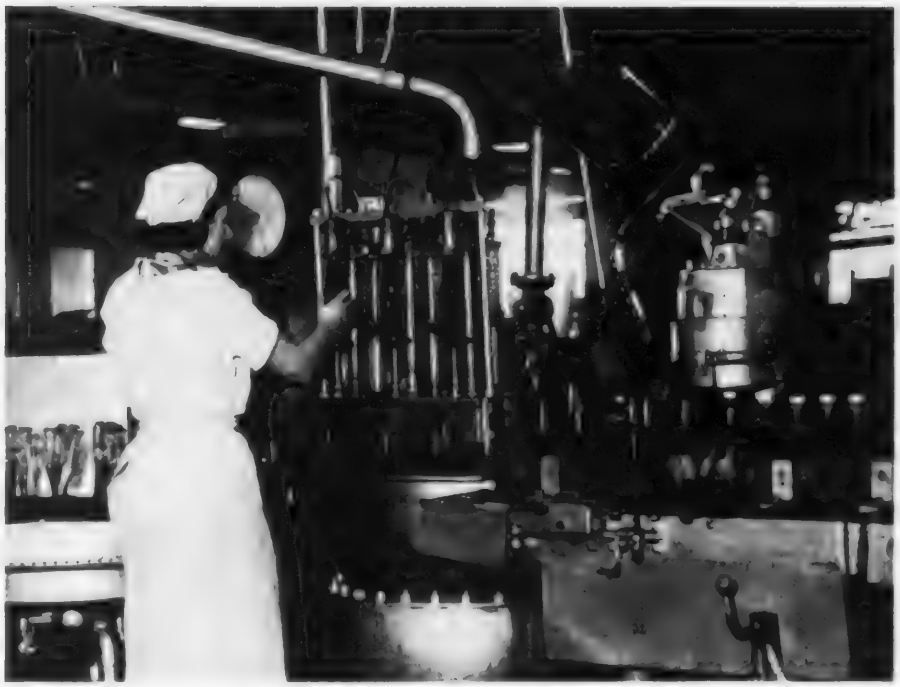
A very large department is devoted to the manufacture of sauces, ketchups, salad cream, and mayonnaise, etc. Stainless steel or glass-lined containers and pipelines are standard throughout this department, and the handling of the finished sauces is characterised by the use of the latest types of automatic machines for bottle washing, drying, filling, and capping. The same mechanical lay-out applies in the chief pickle-filling department, where an ingenious automatic machine fills four bottles of Branston Sweet Pickle at the same time.

Canned Foods

The large range of Crosse and Blackwell canned products are almost too well-known to need mentioning. The Company has specialised in a range of "Ready Meals", which consist of such items as English stewed steak and vegetables, boiled beef and carrots, and Irish stew. These, and a number of other dishes known as "Hot Snacks", which are delicious new savouries consisting of mixtures of beef, macaroni, and mushrooms, and ham, macaroni, vegetables, and tomato, etc., are examples of modern trends in canning. There is a formidable range of Crosse and Blackwell canned products, and they are all prepared with the same meticulous attention to quality.



Bliss 361K High-Speed Seamer.



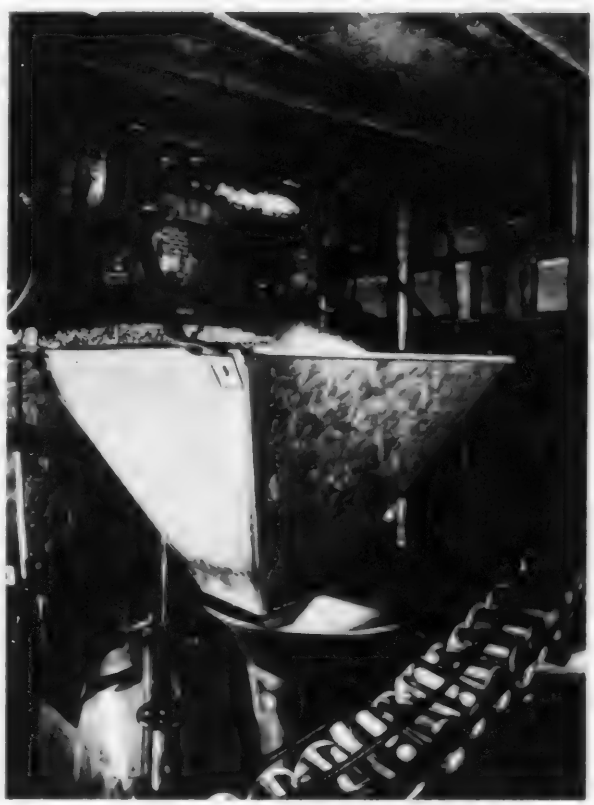
A filling machine for sauces and ketchup.

Suitable Foods for Diabetic Patients

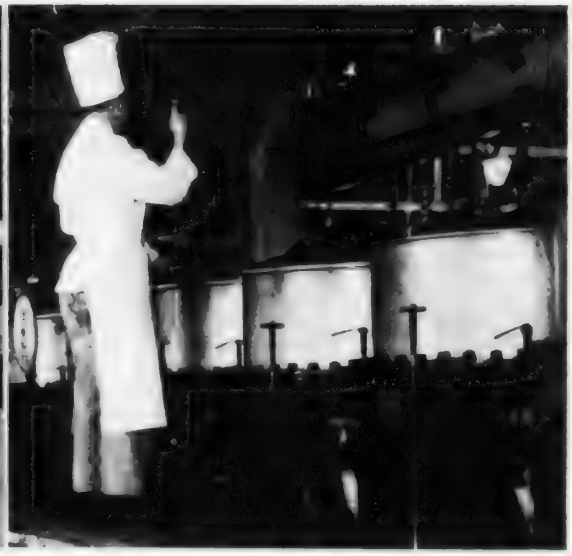
A novel idea which has just recently been put into practice is the issue of information regarding the carbohydrate content of a wide range of Crosse and Blackwell products. This information enables the diabetic patient to relieve the monotony of his controlled diet, by giving him the necessary control over the intake of carbohydrate. In a booklet issued by the Company, figures are given showing the weight in ounces of product equal to 5 gms. of carbohydrate. There is also given a detailed description of the many excellent and tasty products which may be considered "free" of carbohydrate in average helpings. The diabetic in possession of this information is able to buy ordinary products of the Company, as sold by every grocer at their normal costs. It is not necessary to ask for special diabetic packs nor pay special prices.

Training School for Young Employees

One of the problems which crop up in a large-scale factory is the "wastage" of new labour. Young entrants are inexperienced, and if pitch-forked straight into the factory they are under a disadvantage. The new surroundings are bewildering, and the novices feel that they get little sympathy from the "old hands", who, naturally, have their own team job to do. It was no uncommon experience to lose the service of 80 per cent. of new entrants. To remedy this, Crosse and Blackwell instituted a training school. In a quiet room, under expert supervision, new girls are trained to perform various operations. The jobs are graded; the simplest, such as the assembly of pickle caps and bands, are mastered first, then the more intricate jobs of labelling and wrapping are tackled. After a suitable training period the new entrant is ready to take her place with confidence



Canning beans for export.



in a team. The experiment has been entirely successful, and instead of a loss of 80 per cent. it is unusual to find 1 in 10 of the newcomers leaving for employment elsewhere.

Scientific Control

It would need a special article to do justice to the remarkable care taken by Crosse and Blackwell in the direction of scientific control to ensure the perfect quality of their many products. The control is divided between the analytical and bacteriological departments, with the backing of an up-to-date technical research section.

In the analytical laboratory some 40,000 samples, covering the whole range of raw materials, process samples, and finished products are examined chemically in the course of a single year. The control may be divided into four principal sections:

(*a*) Examination of raw materials.
(*b*) The control of factory processes.
(*c*) The examination of factory stocks.
(*d*) General analytical work.

To ensure that the products comply with the Food Regulations, routine examinations are made for arsenic, boric acid, sulphur dioxide, and metallic impurities.

Several very ingenious pieces of apparatus have been devised by the chemists of the Company, especially with the object of reducing the time taken for the various tests without prejudice to their accuracy. Among such apparatus is that for testing the strength of gelatine gels. There is a photo-electric colorimeter for standardising the colour of certain products.

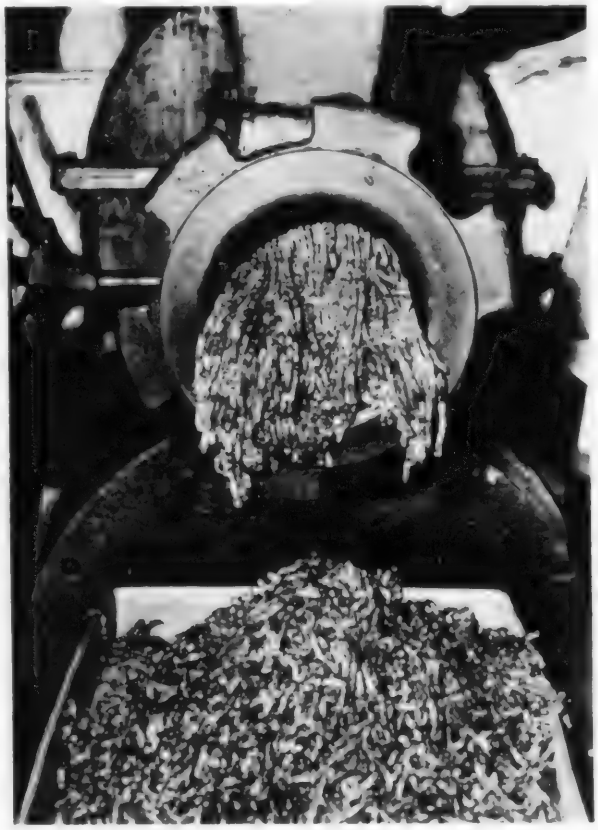
Photographs are constantly taken of can seams, and the photographic room is replete with precision apparatus, including a photo-micrographic outfit, which is used in the routine recording of the dispersion in salad cream and mayonnaise. The grinding of chocolate, icing sugar, and the crystal formation in fondants are also controlled by this method.

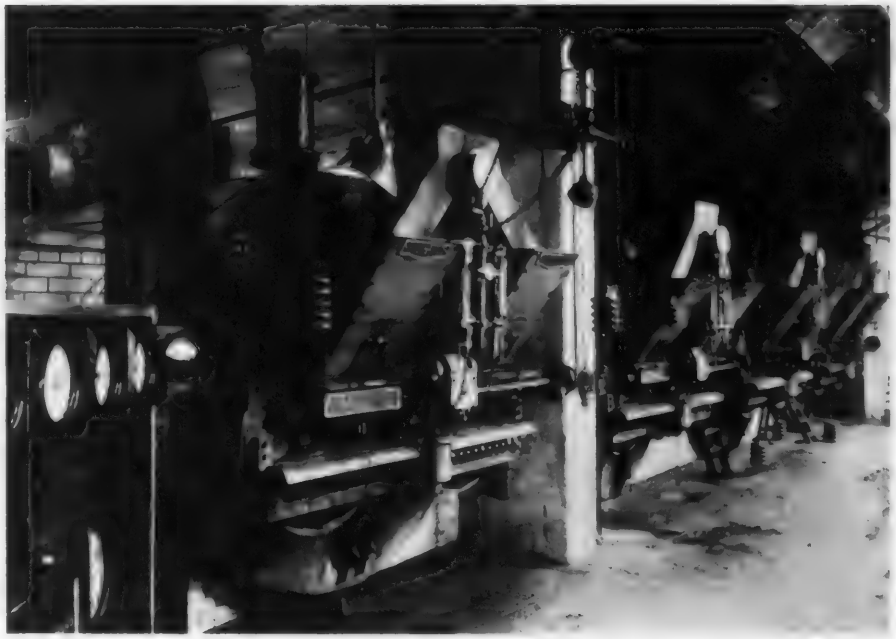
The bacteriological laboratory makes a routine examination of production samples for sterility, and in addi-

Top left: **Filling and closing tins of soup.**

Top right: **A battery of nickel-lined soup-boiling pans.**

Bottom: **A giant meat-mincing machine.**





A view of the boiler-house showing Hodgkinson Automatic Stokers.

tion there is a daily check on thermographic records. The samples examined amount to approximately 60,000 yearly. The bacteriologists also make regular inspections of the manufacturing departments and raw materials to ensure satisfactory factory hygiene.

As would be expected with this progressive organisation there is an active research department. In addition to the usual scientific equipment, this laboratory contains small-scale models of the plant used in the food industry. This enables ready translation of laboratory experiments to full-size batches.

The Boiler-House

The boiler-house is equipped with four 30 ft. by 9 ft. 3 in. Lancashire type dish-ended boilers of a total nominal capacity of 40,000 lb. of steam per hour at 100 lb. per square inch. These are fitted with superheaters giving 120° F. superheat.

Superheated steam is not required for processing, but this degree of superheat compensates for condense and radiation off the mains, which are fairly long and partly in the open.

Economisers are also fitted, giving a feed temperature of 270° F. with inlet temperature of 120° F., thus effecting a considerable saving on the heat balance.

The feed water is partly condense and partly town water, which is softened down to 2° of hardness before being pumped through the economisers to the boilers.

The two-feed pumps are of the marine direct acting type, and one pump only is sufficient to supply the necessary feed, the other being a standby.

The boilers are fitted with circulators, the purpose of which is to boost the water circulation and thus improve heat transference, increasing the efficiency of the boilers.

The coal fired is Northumberland doubles of a calorific value of 12,500 B.T.U.'s. This is delivered by lorry to

A section through the end seam of a can. This picture shows the seaming of the can end to the body. Solder is not used in this process, a tight join being obtained by the can liner applied to the edges of the ends before seaming.

The bacteriological laboratory makes a routine examination of productive samples for sterility, and a daily check on thermographic records. Regular inspections of the manufacturing departments and raw materials are also carried out.

a hopper in the ground adjacent to the boiler-house, from where it is elevated to bunkers holding approximately 270 tons over the top of the boilers. It falls from here by gravity through chutes to the feed hoppers of the stoker gear and thence to the boilers.

The stoker gear is of automatic gritless coking stoker type, capable of burning up to 30 lb. per hour per square foot of grate surface.

Induced draught is supplied by a turbovane grit-arresting fan, which is capable of giving a maximum of 2 inches w.g. This fan serves the dual purpose of supplying induced draught and eliminating grit from the flue gases, the latter function being very necessary in a food factory, apart from the provisions of the Smoke Abatement Act. The gas is discharged to atmosphere through a chimney stack 7 ft. 9 ins. diameter by 156 ft. high.

An additional refinement in the setting of the boilers is the fitting of expansion joints, which allow the boilers to breathe freely on expansion and still maintain the flues in gas-tight condition, which is difficult to maintain with ordinary brickwork settings.

The boiler-house is well-equipped with instruments to enable a high degree of efficiency to be maintained, the general overall efficiency being 75 per cent. The instruments include sensitive pressure gauge, CO_2 continuous recorder, pressure recorder, and feed and gas temperature recorder.

The equipment in the boiler-house has been designed not only from a point of view giving the maximum efficiency permissible with this type of plant, but to provide flexibility which will enable the fluctuating load to be handled satisfactorily without undue loss of efficiency.

Factory Conditions

Modern hygienic systems have been employed in the design of the factory. Ventilation and lighting have been carefully studied, and the kitchens are fitted with steam-removal plant. Anti-corrosive paint in colours of cream and green produce a pleasing effect.

A first-aid room, under the supervision of a qualified nurse, is at the disposal of the staff. Although the majority of the staff live near the factory, there is a comfortable mess-room for those who wish to have their midday meal there.

The factory is closed on Saturday, and the five-day week has been found to operate satisfactorily, the staff preferring the longer working day during the week. The five-day week has become more general during the past few years, and it is instructive to note that Crosse and Blackwell, who rigorously examine every aspect of their business from all angles, have operated the five-day week for over eleven years. In addition, every employee enjoys a summer holiday with pay, and this arrangement also has operated for fourteen years.

A battery of retorts.

Music in Industry

This bids fair to become increasingly popular, and Crosse and Blackwell have installed equipment in all departments. From a radiogram located near the telephone switchboard music is broadcast at suitable periods, including the rest intervals, and this arrangement is greatly appreciated by the staff. A microphone is also used by the telephone operator for "paging" the managerial staff.

A further function performed by this broadcast installation is in connection with A.R.P. A transmitting equipment has been installed to enable the factory manager to communicate with every department. Such an arrangement would prove an excellent innovation in case of any emergency for the prevention of panic, as the operatives could not only be calmed down but be given precise instructions for evacuating the building. In an A.R.P. exercise it was found possible to ensure that 1,600 operatives could be safely housed in the cellars in case of need in the short space of six minutes.

SOME SUPPLIERS TO THE FACTORIES OF CROSSE AND BLACKWELL, LTD.

Filling and Closing Machines: *Metal Closures, Ltd.; Albro Fillers and Engineering Co., Ltd.*

Retort Recorders: *Short and Mason, Ltd.; Cambridge Instrument Co., Ltd.*

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Tinplate: *South Wales Tinplate Corporation; Old Castle Tin Plate Co., Ltd.; Baldwins, Ltd.*

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Boilers: *John Thompson and Co. (Wolverhampton), Ltd.*

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Water Softeners: *Permutit, Ltd.*

Circulators: *Owens Boiler Circulator* (1930), *Ltd.*

Automatic Gritless Coking Stoker: *James Hodgkinson (Salford), Ltd.*

Turbovane Grit Arresting Fan: *James Howden and Co. (Land), Ltd.*

Expansion Joints for Boiler Settings: *Wm. Hamer and Sons, Ltd.*

EMPLOYEE'S RIGHT TO WAGES DURING ILLNESS

By a Barrister-at-Law

RARELY IS a judgment given which affects such a large number of people as the recent judgment of the Court of Appeal in *Marrison* v. *Bell*. Every employer and employee should be acquainted with its effect, and indeed the present appears to be a very opportune moment for reviewing the whole position in regard to the payment of wages to employees during illness.

Let us begin by pointing out that what the Court of Appeal determined in that case is that a sick employee, whose employment is not terminated, is in the absence of any contract to the contrary entitled to be paid during his illness his full wages without any deduction at all in respect of any sickness benefit that he may be receiving during the period in question. This is the purport of the decision, but it requires more detailed examination.

Permanent or Temporary Illness

There is an important distinction for this purpose between permanent and temporary sickness or illness. Where it is *permanent*—that is to say, where there is a reasonable likelihood of the employee being prevented from ever, or except possibly after a considerable interval of time, returning to his job—the employment becomes automatically terminated upon the occurrence of the illness. In such a case no notice terminating the employment is necessary, and the employer immediately ceases to be liable to pay the employee any further wages.

It is quite otherwise, however, where the illness is of a temporary character. Whether it is so or not is a question of fact and degree, but it should be carefully noted that an illness may be temporary even though it is of a prolonged character and happens to last for several weeks, as in the above-mentioned case itself, where the illness lasted for sixteen weeks.

In the case of temporary illness, the contract of employment still continues and the employer accordingly continues to be liable to pay wages to the employee even during his absence from work in consequence of his illness.

Employer's Safeguards

There are several safeguards which an employer may adopt to protect himself in such cases. In the first place, upon the reported absence of the employee because of illness, the employer may give the employee notice terminating his employment. The notice must be of the proper length, whether a week, or month, or longer according to the position of the employee.

Such a course may have its drawbacks inasmuch as the employer will meantime be liable for payment of the wages until the expiry of the notice; and it is obvious that there may be a great deal of inconvenience where a long notice is necessary. Moreover, in the case of a re-

(*Continued on page* 127)

HEAT LOSSES AT THE BOILER-HOUSE

H. C. APPLEBY

About fifty-five per cent. of the heat in fuel is usefully applied to steam formation, the remaining forty-five per cent. being lost on badly worked plants. An average plant should at no time lose more than thirty per cent. of its heat. This article shows where losses should be looked for.

A LARGE number of food manufacturers are burning fuel on a scale too small to warrant the employment of specialist combustion engineers but sufficiently large to be able to leave room for considerable losses on a year's working.

In some of the worst cases, those put in charge of the boilers have little idea about their work except that the water in the gauge glasses must be kept at a predetermined level, that the pointer on the steam-gauge must be kept as near as possible to a given figure on the scale, and that coal must be thrown into the furnace when that pointer tends to rotate back to a lower figure.

Hand-Firing

Small plants, often composed of boilers which have been long in service and to which no modern appliances have been fitted are now, in some cases, with hand-firing securing cheap steam, but these are definitely exceptional. It is quite true that with *good* hand-firing first-class results can be secured; the trouble is that good hand-firing is seldom seen, but for the benefit of Lancashire boiler users the author submits a few practical tips which he has found useful during many years' investigation into fuel economy problems.

Before entering into the small amount of theory which is essential for the fireman to know if he is to carry out his work intelligently and successfully, it may be pointed out that in cases where there is not a specially trained combustion engineer supervising the steam-raising, decreasing the losses calls for close co-operation between those directly concerned, comprising usually (1) the manager, (2) the engineer, and (3) the fireman. The two latter should show a lively interest in their jobs, whilst the former should encourage their efforts to reduce his steam costs by tangible appreciation in some form of bonus.

The fireman should be taught that his main function is not to burn coal but to make steam as cheaply as possible, and it is the engineer's job to persuade the fireman that new methods of firing are worth a trial, and that these methods will result in his work being easier, for, after all, if he is taught to give the required amount of steam and at the same time burn less fuel, he will soon realise that it is better for him to use more thought, and eliminate exhaustion of physical energy by throwing unnecessary coal into the furnaces, and, what is more fatiguing, cleaning unnecessary ash from the furnaces at cleaning-out time.

Average Losses

If we examine an analysis of heat losses at the boiler-house it will be found that generally about 55 per cent. of the heat in the fuel is usefully applied to steam formation, the remaining 45 per cent. being lost on *badly* worked plants. An average plant should at no time lose more than 30 per cent. of its heat, consequently making good use of 70 per cent., whilst a well-run plant (Lancashire type boilers, not the modern water-tube with pre-heated air), should usefully convert 75 to 80 per cent. of the heat value of the fuel into steam.

Stack Losses

Further analysis of the heat losses usually shows that the greatest of these is what are known as "stack-losses," which can, but should not, be as high as 30 per cent. of the total heat supplied. In other words, 30 out of each 100 tons of coal supplied throw off heat which is discharged from the top of the stack. This heat, left in the gases after discharge from the boiler, does no useful work save to help to create the draught—a very expensive way of creating it! This loss is unnecessarily high when excess air is permitted to enter the furnaces and the boiler settings, and can be largely avoided by decreasing the excess air and lowering the temperature of the gases leaving the boilers.

Examination of the theory of combustion shows that approximately 14 pounds of air are required to burn 1 pound of coal. Air is drawn into the furnaces of the boilers at atmospheric temperature and leaves the boiler at a temperature 300°-500° F. higher, dependent upon boiler conditions. In that air is all the heat which it absorbed in being heated up to, say, 500° F. Each pound of air absorbs approximately one-fourth of a heat

CHIEF SOURCES OF LO
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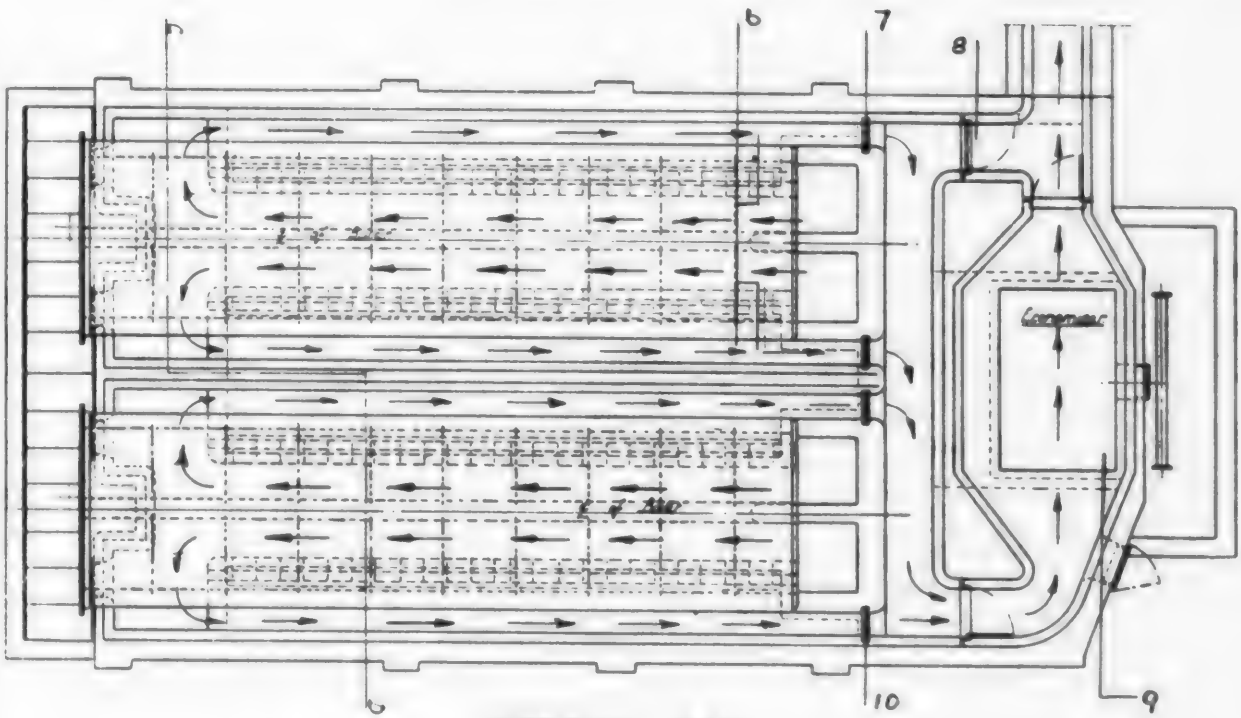
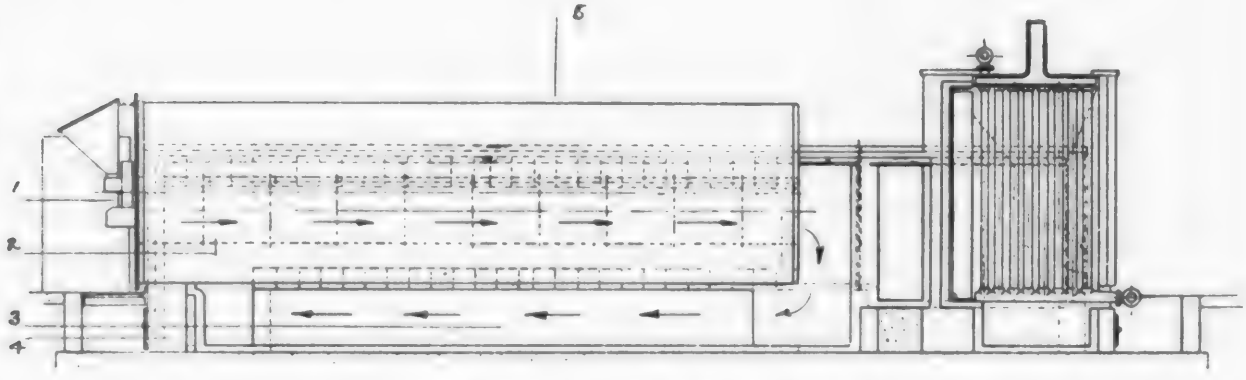


SECTIONAL PLAN

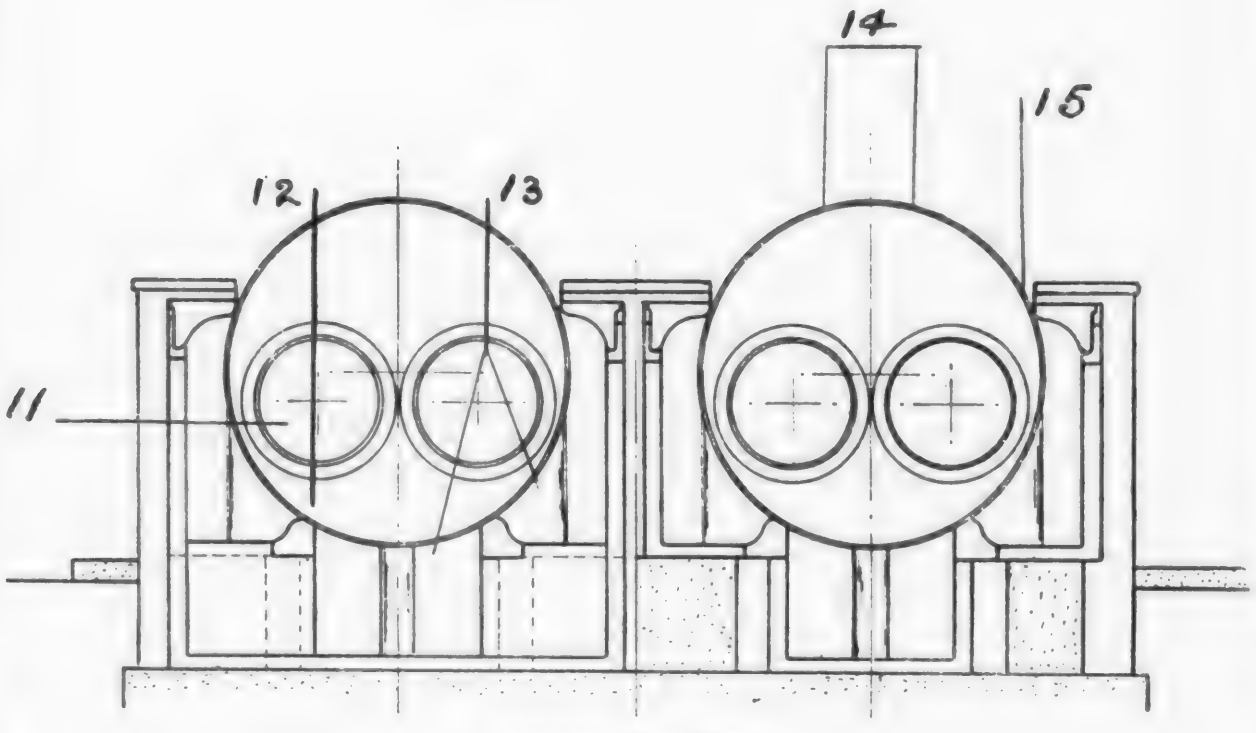
1. Air leakage through broken or badly fitting furnace doors.
2. Air leaking into combustion chamber through uncovered fire bars or holes in the fire. A fuel bed that is not level has a similar effect.
3. Infiltration of air through cracked side walls.
4. Leakage of hot water at blow-down valve.
5. Leakage of steam at improperly set safety-valve.
6. Short-circuiting of gases from under-flue to side flues through broken or cracked boiler seatings.
7. Leakage of air into flues through damper slots when the latter are unnecessarily large.
8. Hot gases escaping through badly fitting or buckled damper at by-pass to stack.
9. Insufficient heating surface of economisers.
10. Low CO_2 content of gases when leaving the boiler, and excessively high temperature gases, *i.e.*, more than 300° F. to 400° F., depending upon local conditions.
11. Unburned coal in ash-pits.
12. Scale on all, or any part of, the interior of the boiler.
13. Soot or tarry deposit on the fire side of the furnace tubes, or on the outer surface of the shell in the side flues and under-flue.
14. Radiation losses where exposed parts of the boiler shell and mountings are not insulated.
15. Air leaking into flues at point where brickwork joins boiler-shell.

KEY TO DIAGRAMS

SSES AT LANCASHIRE SIMILAR TYPES



LONGITUDINAL ELEVATION



SECTION ON CD

DIAGRAMS

SHOWING

CHIEF SOURCES OF LOSSES AT LANCASHIRE BOILERS AND SIMILAR TYPES

BY H. C. APPLEBY

Issued by FOOD MANUFACTURE (*Leonard Hill Limited*)
17 Stratford Place, London, W.1

★ HANG THIS IN YOUR BOILER HOUSE ★

unit for each degree of temperature increase, so that each pound of air in being heated 400 degrees absorbs 100 heat units. Fourteen pounds of air will absorb $14 \times 100 = 1,400$ heat units.

Let it now be supposed that *double* the necessary amount of air is admitted to the furnace—*i.e.*, 28 pounds, the heat carried to the stack will be 28×100 heat units, which is twice as much as in the previous instance. From this it will be seen that the value of the heat carried to the stack by the flue gases is largely dependent upon the weight of air entering the furnace and the subsequent rise in temperature, and it is important to remember that air which is in excess of that actually required for combustion of the fuel absorbs heat which should be used for evaporative purposes and is wasted.

Unburned Gases

On the other hand, some of the heat lost at the stack comprises unburned combustible gas and visible smoke, and is caused by not having just sufficient air in the furnace at the right time in order completely to burn the gases rising from the fuel. This loss is usually not so great as that caused by excess air. In order to press home this point the author recalls the following case in which he was brought in for consultation.

At a large ironworks in the North of England waste gases from blast furnaces were trunked off to the front of a battery of 24 boilers, which included Lancashire, water-tube, and Scotch boilers. A gas-cleaning plant was introduced between the blast-furnaces and the boilers, which very effectively disposed of the dust content contained in the gases and delivered a supply of clean gas to special burners attached to the front of the furnaces of the boilers. This special cleaning plant cost several thousand pounds. To the dismay of the engineers when it was put into operation, the boilers would not generate as much steam as they did previously. The special gas-burners which had been fitted to the furnaces were adjusted and re-adjusted, but with very little success. Eventually, the gases were analysed, the analysis showing heavy excess air, and an examination of the boilers showed that, whilst the engineers had spent a lot of time trying different adjustments of the burners, they had not looked at the main control for their draught (and, of course, air supply), which was at the dampers at the back of the boilers. These were eventually found wide open and were pulling in excess air at all times. They were immediately closed down till less than two-thirds of the available aperture was being utilised, and the steam pressure was thereby raised to blowing-off point in a few minutes.

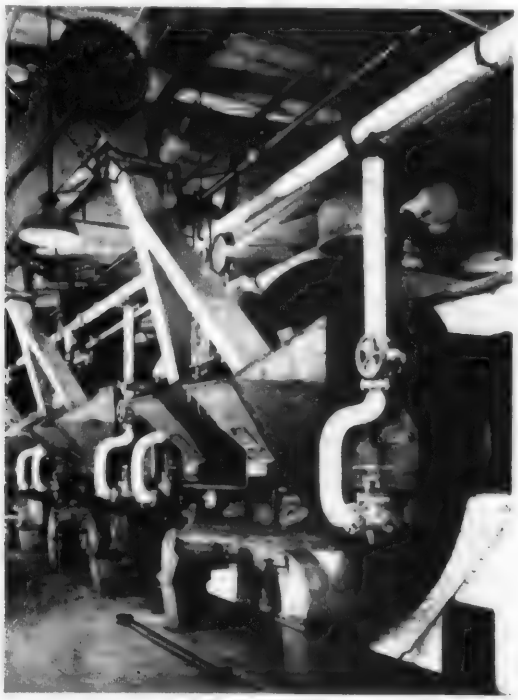


Fig. 1.—Bennis Coking Stokers at Nottingham Co-operative Dairy, Meadow Lane, Nottingham.

Analysis of Gases

It will be thus seen that the way to determine stack losses is by chemical analysis of the flue gases, together with measurement of their temperature. For the former is recommended the Orsat apparatus or some modified form of it. It is astonishing, but nevertheless true, that many works engineers have not ever seen, or perhaps heard of, an Orsat, and do not realise its value in the boiler-house, but, once having learned how to manipulate one (not a difficult thing), and having realised the enormous help it can afford, it will be considered of more use than many of his other tools.

In place of, or in addition to the Orsat, a valuable apparatus for determining the amount of excess air entering the furnace is an automatic carbon-dioxide recorder, which is more costly than an Orsat gas analyser, although it does not indicate incompleteness of combustion, and, where installed, should be periodically checked by an Orsat apparatus.

Having found excess air in the flue gases (the Orsat shows this by high oxygen and low carbon-dioxide content) it is necessary to look for and prevent it. The cause may be leaky boiler settings; an uneven fuel bed or holes in the fuel bed; too much disturbance of the fires by slicing and raking; leakage of air into the settings at the dampers; badly fitting furnace doors that cannot be properly closed; or the leaving open of furnace doors longer than is necessary when hand-firing or cleaning out the fires.

There is work that is outside the scope of the fireman's duties such as preventing all possible air leakages into the boiler settings, and in this direction it should be pointed out that the losses from air leaks of this kind are much more serious than the losses which are so obvious, such as leaking joints and glands.

Insufficient Air Supply

Presuming that the air supply is *insufficient*, what happens? On a hand-fired boiler the fires are usually

FIG. 2.—Bennis Forced Air Draught Sprinkler Stokers.

from 3½ inches to 7 inches thick, and, as stated previously, each pound of coal requires 14 pounds of air if it is to be completely burned. If this air is not supplied, and, in addition, provision is not made for part of it to mix with the combustible gases rising from the fire, it is certain that incomplete combustion will ensue.

Normally, a little more than half the required 14 pounds of air passes from under the grate and through the fuel, and the remainder should be supplied so as to sweep the top of the fire, because the air passing through the fire gasifies the coal, and this gas has to be burned in the combustion space above the fire, where the final stage of combustion is completed by uniting with the air passing over the top of the fire.

Provision for mixing this air is usually arranged by admitting it through slots in the furnace doors, so designed that a rotating damper in front of them can be so adjusted that thin streams of air can be directed at high speed amongst the combustible gases. When the fireman has delivered a fresh charge of coal to his furnace and the furnace door is closed, the damper should always be adjusted in order to secure complete combustion.

A further point of great importance is to keep the temperature of the gases leaving the boiler as low as possible and at the same time to keep air-tight the passages through which they pass in and around the boiler.

Absorption of Heat

The commonest cause of stack-losses apart from incomplete combustion is the inability of the boiler to absorb all the available heat provided by the hot gases.

The two chief faults in this direction are accumulation of soot on the outer surface of the boiler and formation of scale on the inner surface. Soot and scale both have the power of high resistance to penetration of heat, and if the water inside the boiler cannot receive the heat from the gases because either is adhering to the boiler surfaces, then the stack temperature losses are increased.

The most satisfactory way of preventing this is to take a temperature reading of the gases at the dampers of the boilers as soon as the boilers are working at normal rating after they have been thoroughly scaled and sooted and again just before shutting down for cleaning. Reference to the diagrams will show that the gases, after leaving the fuel bed and having passed along the furnace tubes (as shown by the direction of the arrows), flow along the down-take to the under-flue, where they are directed towards the front of the boiler. Just before reaching that point the gases split and each half of the total volume is reversed in direction, one half to the left and the other half to the right of the under-flue, and in both cases go to the back of the boiler, via the side-flues, before proceeding to the stack.

Direction of Flow

Consideration of this direction of flow of gases brings us to what the author has on many occasions found to be a cause of serious loss on plants which were otherwise in good condition.

As the diagrams show, the under-flue and side-flues are formed by the foundation of the boiler as the bottom of the chambers, the four walls as sides, and the shell of the boiler as the top.

The temperature of the gas leaving the boiler furnace-tubes may be 1,600°-1,800° F. when passing through the down-take, and, providing the boilers are clean internally and externally, should, after having travelled along the under-flue towards the front of the boiler, then back along the side-flues to the dampers at the boiler exit for gases, be reduced in temperature to about 300°-400° F.

Very often when boilers have been put into operation after a thorough internal and external cleaning the temperature is more than double that given, and therefore the loss more than doubled, due to the boiler seatings—*i.e.*, the two walls separating the under-flue from the side-flues and on which the boiler rests—not being maintained in a tight condition.

Brickwork Defects

If, due to expansion and contraction of the boiler, bricks have been dislodged (this is a common occurrence), the result is that a hole is formed between the top of the brickwork and the shell of the boiler. As the gases follow the least line of resistance they pass through holes of this kind, from the under-flue to the side-flues, and if this should happen at the back-end of the boiler where the gases are just entering the under-flue, whereby they are short-circuited into the side-flue and near to the boiler damper, thus failing to traverse the whole length of the boiler twice, the heat units are directed to the stack and, accomplishing no useful purpose, can occasion a very serious loss.

Mechanical Stokers

When one considers how highly technical the fireman's job is, it appears quite logical to consider whether means can be introduced to mechanise a portion of his duties

so that cutting down his physical duties may enable him to give sufficient attention to mechanical apparatus which will, if given proper attention, give results as near perfection as is either humanly or mechanically possible. First-rate, thoroughly efficient firemen are hard to find, but what is more important, it has been definitely proved by hundreds of manufacturers that even on small installations a mechanical stoker operated by a good fireman can give more consistently good performances than can a purely hand-fired job.

Large combines with hundreds of boilers of all kinds almost invariably have mechanical stokers fitted to their boilers, and there are few cases where the introduction of this class of apparatus would not be a sound investment. It is usually found that by introducing a first-class machine the steaming capacity of a hand-fired plant will be increased from 20 to 30 per cent. and to effect a saving of fuel from 10 to 15 per cent. for equal boiler evaporation, even on an installation where the hand-firing is above the average.

One very well known make of mechanical stoker (Fig. 1) has been introduced at Nottingham Co-operative Society's Dairy, where steam plays an important part in the processing, largely in connection with the refrigeration and pasteurisation plants. For the former a 65-ton ammonia compressor driven by a twin-cylinder pass-out steam engine is installed. The brine is pumped to the pasteurising plant, butter-making, cream separating and cold rooms by means of submerged pumps, and pass-out steam at 40 pounds per square inch is utilised in the pasteurising plant for heating purposes and creating vacuum in the milk-holders.

Two bottle washing and filling machines, each of which can deal with more than 10,000 bottles per hour, are supplied with low-pressure steam, as is also the bottle steriliser. In the latter the bottles are under 5 pounds per square inch pressure for 30 minutes, the total time for complete sterilisation being 50 minutes, whilst other uses for steam include milk and cream heating in the separating room, and for water-jacketed steam-heated pans in the cheese factory, as well as for the milk-dryer, whey drying, the bakery, the mineral-water factory and central heating for the offices.

An installation of this kind demands reliability of steam supply and it is significant that this two-boiler job is not done by hand, but with mechanical stokers, as are many thousands of others.

(*Continued on page* 133)

Tests showing comparison between hand-firing and automatic stoking

	Hand-firing	*Automatic stoking*
System of firing	*Hand-firing*	*Automatic stoking*
Duration of test, hours	7	7½
Number of boilers	2	1
Type of boiler, 8 ft. by 30 ft.	*Lancs*	*Lancs*
Heating surface of each boiler, sq. ft.	1,000	1,000
Heating surface of economiser, sq. ft.	1,200	1,200
Nature of draught	*Natural*	*Balanced*
Water gauge draught over fire, ins.	0·31	0·12
Temperature of flue gases (chimney base), ° F.	520	360[1]
CO_2 in flue gases (chimney base), per cent.	8·0	8·0[1]
Smoke	*Slight haze*	*Slight haze*
Temperature of feed water to economiser, ° F.	112	111
Temperature of feed water to boiler, ° F.	227	230
Steam pressure by gauge, lb. per sq. in.	57	63
Heat per lb. of water, economiser, B.Th.U.	115	119
Heat per lb. of water, boiler, B.Th.U.	989·3	988
Name of fuel	*Newstead Large Coal*	*Northumberland Singles (seaborne)*
Calorific value, as fired, B.Th.U.	12,650	12,922
Proximate analysis:		
Volatile, per cent.	31·51	33·19
Fixed carbon, per cent.	56·10	56·29
Ash, per cent.	5·89	4·02
Moisture, per cent.	6·50	6·50
Fuel burnt per sq. ft. of grate per hour, lb.	11·82	24·4
Equivalent evaporations as from and at 212° F.:		
Water per boiler per hour, lb.	4,460	8,624[2]
Water per sq. ft. boiler heating surface per hour, lb	4·46	8·624
Water per lb. fuel, lb.	9·01	10·263
Thermal Efficiency: Boiler and economiser, per cent.	69·1	77·099

[1] *Measured at a point affected by cold air from another flue not in use.*

[2] *Considerably more steam could have been made, but was not required.*

THE AIR-BINDING OF STEAM-HEATED VESSELS

L. G. NORTHCROFT, B.Sc. (Eng.), A.M.I.Mech.E.

FOOD MANUFACTURE depends on steam more than on any other medium for the source of heat. For speed of production and economy of fuel, it is of the utmost importance always to ensure that steam and steam only fills your pipe-lines, your steaming ovens, your jacketed pans and your drying cylinders.

The presence of water in the steam lowers the heat efficiency of the equipment, but, of course, everybody knows that such water must be discharged through steam-traps. It is not so often appreciated that air is also present in this equipment, and such air is also lowering its heat efficiency.

Shutting Down Plant

It is not general practice for a plant to run twenty-four hours a day for seven days in the week. There are periods when the plant is shut down. When steam is turned off and the plant goes cold either of two things will happen. More commonly the system will fill up with air through cracked or leaking valves, through open-ended steam-pipes, or through faulty steam-traps. If there are no open ends and your plant is in first-class condition, the steam in the system will condense and a vacuum will form.

When the plant is started up again and steam is turned on, if the plant is full of air it will be necessary for all of this air to be driven out before your heating surfaces are giving their best results. The bulk of the air will be driven out through your steam-traps, always providing they are of a type which will automatically discharge air, but there will inevitably be pockets of air left which cannot escape.

Entrained Air

Consider the particular case of a steam-jacketed pan where steam is fed in through one trunnion and the condensate is delivered out of the other trunnion. If this pan is fitted with a steam-trap, as it should be, the air in the jacket will rise to the top as soon as steam enters, and there it is likely to remain because the outlet from the jacket is through a syphon pipe at the bottom. Unless special methods are adopted to get rid of this entrained air, you will not get the best possible production from that pan. It is strongly recommended that a thermostatic air release be fitted on such a jacket. It has been found from actual figures on a 100-gallon pan that the boiling time has been reduced from 28½ minutes to 18 minutes simply by removing air.

Steaming Ovens

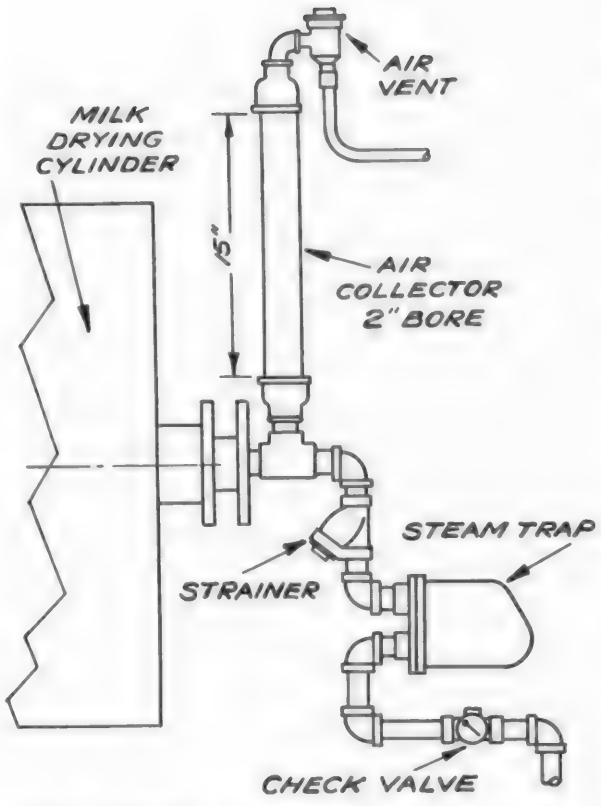
Another piece of equipment which is continually being filled with air is a steaming oven. Whenever one batch has been completed and the doors opened the oven will completely fill with air. When steam is turned on, this air will tend to rise to the top of the oven and will remain there unless it can be vented through a thermostatic air release.

Steam-heated drying cylinders are not very widely used in the manufacture of food except in the milk industry, where they are common. Drying cylinders of all things are most prone to air-binding.

The recommended method for air-venting and also steam-trapping a drying cylinder is shown in the diagram. Such a cylinder, which previously was drained through a cracked valve and with no air release, after being fitted with this equipment gave slightly greater heat with 20 per cent. less steam consumption.

Automatic Air Release

It has been said that on starting up from cold the bulk of the air from the system is swept out through the steam-traps, but if these traps are of the large mechanical type they may not be fitted with automatic air releases. In such a case it is necessary for a man to go round and open a pet-cock to allow the air to escape. Then after a period the man must go round again and shut the pet-cocks. This hit-and-miss method is not scientific, and we suggest that a far better way is to tap into the top of such traps and fit them also with a thermostatic air release.



Drying cylinders of all kinds are most prone to air-binding. The recommended method for air-venting and also steam-trapping a drying cylinder is shown above.

In all this it has been presupposed that, when cold, the system fills with air. The other suggestion was that the plant is in sufficiently good condition for a vacuum to form when steam is turned off. When this steam is turned on again there is every possibility of severe water hammer being set up, and this may be a source of danger, and is certainly a contributory cause of damaged valves, reducing valves, joints and steam-traps.

It is much better to fit thermostatic air releases on the plant, and these, besides discharging air, will act as vacuum breakers when the plant is cold.

Air in Feed Water

It is not only when the plant is shut down that air will get into it. Air is continually being formed in the system because it is entrained in the feed water and released from the steam. This is another reason why the manual operation of air-cocks can never be really satisfactory. The operator just does not know when air is there or when it is not there without going round his plant. It is much better to use automatic equipment which will take care of the removal of air as and when it forms.

Employee's Right to Wages During Illness

(*Continued from page* 121)

liable and useful employee, it may not be in the interests of the employer to lose the services of a person who to a great extent may be one of the mainstays of the business.

Express Agreements Preferable

It is far preferable therefore for an employer to limit his liability by express agreement with the employee, and moreover this procedure would have the advantage of enabling the employer to limit his liability to whatever extent he pleases.

It is desirable therefore when engaging an employee to get him to enter into an express contract limiting the employer's liability for payment of wages to the employee during the latter's illness. And such a contract can equally well be made with a person who is already employed. One other advantage of this method is that the subsistence of the contract of employment during the employee's absence will not be affected at all.

But apart from any such contract, and while the contract of employment is still subsisting, the employee will enjoy the legal right of drawing during his absence owing to temporary illness his full wages. No deduction may be made in respect of sickness or any other National Health benefits, for the reason that the Statute that created them intended them to be additional benefits—*i.e.*, additional to such other beneficial emoluments to which the employee might be entitled during illness.

Workmen's Compensation

It is otherwise, however, with regard to workmen's compensation payable to an employee incapacitated as the result of an accident in the course of his employment.

Such compensation is in lieu of payment of part of the employee's earnings, and for this reason the Courts have held in earlier cases that the amount of such compensation may be properly deducted by the employer from the wages payable to the employee during his absence from work owing to his incapacity.

Pass-Out Turbines

Although there are many instances in which a back-pressure turbine fulfils all requirements, it is more usually found that the demand for process steam does not coincide very closely with the demand for power. When this is so, the pass-out type of turbine is to be preferred. In this type of turbine, high-pressure steam is expanded in a portion of the turbine blading until it has fallen to a pressure corresponding to that required for the process work. It is then passed out from the turbine to the factory or mill at this pressure. The steam pressure at the pass-out point is maintained at the required value by an automatic valve. In its passage through the high-pressure portion of the turbine the steam develops power which may either be used for driving an electric generator or may be transmitted directly to the shafting of the factory by a rope-drive or by gearing.

THE WORK OF THE FUEL RESEARCH STATION

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH

DESCRIBED BY
THE SENIOR SCIENTIFIC OFFICER

A. T. Barber, B.Sc., M.I.Mech.E.

AT NO period in the history of coal has the question of the most efficient use of this mineral been of such great and general importance. For a very long time coal was just coal, but it might be good or bad depending on the supplier or the user. It is now recognised that although coal varies widely in its properties and characteristics, it can be selected and used in such a way that these variations can be utilised to the best advantage for whatever purpose is required.

Economic considerations have usually provided the stimulus for the search for fuels most suitable for a particular industry, but it is obvious that the coal resources of the country generally can only be effectively explored by a well organised research institution unhindered by commercial considerations.

Systematic Survey

The Fuel Research Organisation of the Department of Scientific and Industrial Research is unique among other similar organisations in that one of its principal activities, in fact the most important, is the systematic survey of the chemical and physical characteristics of the coal resources of the country. This survey, which was inaugurated in 1922, has now established stations and laboratories in nine districts, covering all the principal coalfields in Great Britain.

The officers of the survey stations work with a committee of the coal owners in their district, so that first-hand and reliable information regarding the working of seams is readily available and thus the progress of the survey is able to keep thoroughly up to date and in step with the extension of the mine workings. By arrangement with the mine owners the survey officers obtain pillar samples carefully cut by hand from the full depth of a seam. These samples are transported to the survey laboratory, where they are examined layer by layer so that a complete record can be made of the chemical and physical properties of the seam from floor to roof. The results of these analyses are plotted on a map of the actual seam workings so that any variations of a particular characteristic may be traced. For example, the variation in content of volatile matter may be shown on the chart by a series of "isovol" lines similar in appearance to the contour lines on an Ordnance map, and thus if a coal of a certain volatile content is required the map will indicate where this may be obtained at the moment or in which direction the workings must be carried to produce coal of the required quality.

Classification of Coal

While the laboratory examination and tests are very complete and enable one to classify the coals fairly accurately with regard to their probable behaviour or suitability for particular purposes, it is sometimes necessary to supplement the laboratory tests with tests on a larger scale, where a particular coal is proposed to be used for some special purpose. Arrangements can then be made for a consignment to be sent to the Fuel Research Station at Greenwich, which is equipped with plant for treating parcels of coal from a few pounds up to several hundred tons.

Though the Fuel Research Station is in this respect complementary to the Coal Survey organisation, its work naturally covers a very much wider field in the investigation of industrial fuel problems and the development of new ideas and processes in the production of special fuels from our native coal. While a section of the staff is occupied in the purely scientific work of probing the mysteries of the fundamental constitution of coal, the major part of the researches is carried out on a scale comparable with commercial processes.

Gas Production

Thus for investigation of the problems in the carbonising and gas industry the station has erected several settings of full-size retorts of various types and could, if need be, supply the gas requirements of some 16,000 people. The results of the experiments carried out on these settings have shown ways in which the output of gas per ton of coal could be improved or the through-

Cutting a seam sample in the coal mine.

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put of retorts increased so that peak loads could be met without the necessity of installing or maintaining expensive standby plant. Some of these methods have been already adopted by gas undertakings with satisfactory results.

Oil from Coal

One of the chief considerations which led to the establishment of the Fuel Research Station in 1918 was the possibility of obtaining oil from British coal, and this has since continued to be a major programme. In its earlier days the problem was one of developing a satisfactory system of carbonisation at temperatures which would yield the greatest amount of tar or oil suitable for conversion into fuels for internal combustion engines or boilers. After long experiments a process has been developed using a special design of brick retorts which, besides giving a satisfactory yield of a tar eminently suitable for hydrogenation, also produces a smokeless solid fuel suitable for domestic use. Upwards of fifty different coals have been dealt with in these retorts without difficulty at throughputs varying from five to ten tons per retort per day depending on the caking characteristics of the coal. This type of retort is now being used commercially. A special investigation carried out in these retorts was the development of a process for manufacturing activated carbon from coal. This was successfully accomplished and the carbon has been proved to be quite satisfactory for use in gas masks, for solvent recovery and decolorising.

The production of oil and motor spirit by the hydrogenation of coal or tar has been the subject of active investigation since 1924, and the first continuous process of coal hydrogenation in this country was started at the Fuel Research Station in 1926. Since these processes are operated under pressures up to 6,000 lbs. per sq. in., and at elevated temperatures, and depend on the use of catalysts, it will be realised that a great many difficult problems in chemical and mechanical engineering had to be solved in the pioneer development work. Subsequently the process has been developed commercially by chemical industry.

Synthetic Oils

Side by side with the hydrogenation programme the staff at Greenwich have elaborated the method of producing hydrogen by the action of superheated steam on iron in specially designed retorts. Hydrogen produced in this way, in conjunction with blue water gas made by the action of steam on hot coke, forms the raw materials for the latest process for the production of oils by synthesis, or the building up of liquid hydrocarbons from the constituent gases, hydrogen and carbon monoxide. The development of this process is being studied at Greenwich in a specially designed plant, a feature of which, in contradistinction to the hydrogenation process, is that it is carried out under normal pressures. The process yields a very wide range of products from light spirit to heavy wax, and promises to be a useful source of lubricating oils.

Pulverised Fuel

While Lancashire boilers continue to be largely used for steam generation in factories, particularly those requiring steam for their manufacturing processes, improvements in the methods of firing this type of boiler have not advanced to anything like the same degree of perfection as in the case of the large water-tube boilers in power stations, etc. The Fuel Research Station has

devoted considerable attention to the firing of these narrow-flued boilers and has designed burners whereby coal can be burned efficiently in pulverised form in the very restricted combustion chambers of boilers of the Lancashire type. This method of firing offers a special attraction in connection with increased steaming capacity owing to the high rates of firing that are possible with these burners, and in cases where the system has been installed commercially increased steaming rates of 100 per cent. above normal rating are readily obtained.

Coal Preparation

The widening appreciation of the special needs of the coal-consuming industries has naturally led to increasing attention being paid to the preparation of coal for the market. The Fuel Research Station has installed various types of plant for the study of problems connected with the breaking and sizing of coal, and for cleaning in order to reduce the quantity of ash or to remove other objectionable impurities. The cleaning of the very small sizes of coal down to dust is nowadays of great importance, and this brings many other problems in its train, such as the importance of desliming to remove clays and the difficulties associated with the clarification of washery water and with the sedimentation of slurries. Work has also been carried out on the development of a new type of dry-cleaning plant for coal and on methods of treating coal slacks in order to prevent dust while handling. A study is also made of the deterioration and disintegration of different types of coal when stored in the open for long periods.

Solid Fuel Engine

The liquid fuel internal combustion engine, although usually employed in comparatively small units, is by reason of convenience and the vast number of these units a most important source of power, but is practically entirely dependent on imported supplies of fuel. As a safeguard in emergency and to provide for the possible depletion or restriction of the natural sources of oil supply, it is vitally necessary to explore the means whereby this type of engine can be made to operate directly on solid fuel. Three methods are available: (1) To use gas derived from coal, compressed into cylinders carried on a vehicle; (2) to use the solid fuel for generating producer gas to take the place of petrol; and (3) to inject pulverised coal directly into the cylinders of engines of the diesel type.

The second of these methods is being studied at Greenwich by carrying out tests on commercially produced gas generators fitted to motor lorries and using fuels derived from various coals in order to determine the most satisfactory method of obtaining suitable fuel from widely varying sources. In addition, new principles of gas-producer design are being examined.

In considering the third method it is interesting to recall that the forerunner of the diesel engine was intended to run on solid fuel, but abandoned owing to the greater convenience of the liquid fuel. At Greenwich a 90 h.p. diesel engine has been modified so that finely powdered coal can be injected into the cylinder instead of oil, power being developed by the combustion of the coal inside the engine cylinder. Naturally the ash from the burnt coal must be discharged through the engine exhaust; any particles left on the cylinder walls will tend to cause excessive wear of the cylinder and piston rings. The effect of ash dust on wear is being studied by injecting ash into small petrol-driven engines in which various combinations of cylinder liners, pistons and rings are tested. The results indicate the materials which should be used in order to obtain a reasonably long life for the working parts of a coal-dust engine.

The Smoke Nuisance

The problem of the domestic fire has always been a feature of the work of the Fuel Research Station, principally from the point of view of eliminating the smoke nuisance of cities. As previously mentioned, the development of a low temperature carbonising process has two aims, the production of oil fuel and a solid smokeless fuel for domestic use. In addition to the experimental work on the retorts at the station, a team of trained observers has always been available to conduct scientific tests on plants operating commercially for the production of smokeless fuel so that the value of these processes may be correctly assessed.

A method of determining the suitability of these artificial fuels for use in the open domestic grate has been evolved so that a reliable comparison may be made. Tests are also carried out in specially constructed rooms on various designs of firegrate and other means of reducing the smoke produced when bituminous coal is used.

This account merely gives a broad outline of the organisation and work of the Fuel Research Station, and there are many other subsidiary programmes on which work proceeds. Very often a particular investigation along one line will open up lines of enquiry in other directions. Whenever possible the work on one programme is made to serve the requirements of one or more other programmes. For example, a coal which is the subject of a cleaning investigation may after treatment become the material for carbonisation experiments, which may in turn yield tar for the hydrogenation work or coke for gas-producer trials.

British Association of Chemists

On Tuesday evening, March 14, at 8 p.m., Professor J. B. S. Haldane, F.R.S., of University College, London, lectured to a very full meeting of the British Association of Chemists at Conway Hall, London, W.C. 1, on "Heredity, Chemistry and Politics".

Professor Haldane traced the influence of groups of radicles on the colour of flowers and mentioned substances which were associated with such matters as colour and some pathological conditions in man.

The lecture was listened to with great interest by a representative gathering of chemists and others and the discussion which followed bore witness to its wide appeal.

Dr. J. V. Eyre, M.A., Ph.D. (Leipzig), occupied the chair and expressed on behalf of all present their keen appreciation of Professor Haldane's address.

MODERN MARGARINE MANUFACTURE

LARS ERLANDSEN

THE ORIGINAL method for making margarine which is still used in many parts of the world is broadly as follows: The mixture of fats is melted, sour skim milk is added, and then all is churned in an emulsion churn. This emulsion is cooled by ice-cold water. The mass obtained in this manner is of a short consistency and contains large amounts of water, and must, therefore, pass through several kneading machines in order to bring the water content down to 16 per cent., which is the allowed maximum of water, and to give it the fine consistency aimed at. This is carried out in a plant consisting of a series of rolling and kneading machines, with smooth or grooved rollers, single, in pairs, or in multiplex formation. The last stage of this method of manufacture is generally the treatment in a mixing machine, the purpose of which is both to give the margarine a certain soft and smooth consistency and to serve as a means for the admixture of such substances as cream, butter, colour, salt, lecithin and, in cases where too much moisture has been eliminated by the rolling plant, water.

The Cooling Drum

This method of manufacture possesses several disadvantages, one important one being the admixture of a large amount of water, the subsequent removal of which requires much time and power. For several years a method was sought which would avoid this, and with the invention of the cooling drum the problem was solved. From the churns the emulsion is pumped on to large drums, the surface of which, by means of certain cooling liquids or gases, is given a suitably low temperature. When this method was first adopted the cooling liquid was a cold brine circulating in the drum, but now all cooling drums are built for direct expansion of ammonia (Fig. 1).

Up to this stage this is how most of the margarine factories are working to-day. When there are two or more churns working alternately it is possible, in spite of the discontinuous working of the churns, to obtain a certain continuity in the cooling of the emulsion. The subsequent handling, however, is still discontinuous.

Continuous Processes

The aim of modern technical progress, however, is concerned with the replacement of the old discontinuous methods by continuous ones. The problem is to render continuous the emulsifying process and the working of the crystallised emulsion. The solution of these two problems has also, due to comprehensive experiment and research work, during the last few years, been obtained successfully, and it is now possible to produce margarine continuously. The most difficult problem was not continuous production but continuous after-working, as will be explained below.

There are now several plants by means of which it is possible to produce a continuous current of margarine emulsion, the first one among these being the homogenisation plants used in the dairy industry,[1] but to the author's knowledge these plants are not extensively used in the margarine industry, presumably due to the fact that it is inadvisable to put dairy machines into a margarine factory and then call them margarine machines. It may be mentioned that some factories have tried to use a dairy-like margarine manufacturing process, but

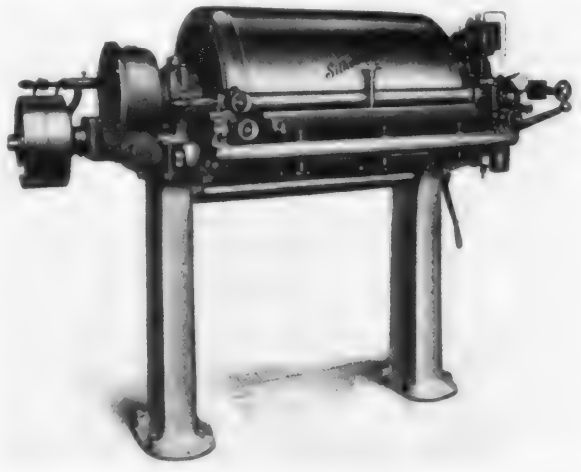


FIG. 1.—". . . from the churns the emulsion is pumped on to large drums."

most of them have soon abandoned it and returned to ordinary margarine methods.

The emulsifier of Silkeborg[2] was a step in the right direction, but with the Gerstenberg rotor emulsifier the most perfect continuous emulsion production has been reached.

The Crystallised Product

As mentioned before, the problem of continuous working of the crystallised product has, however, been most difficult to solve. Some years ago a margarine plant firm tried to make this in a very simple manner; after crystallisation margarine had only to pass between a pair of smooth stainless steel rollers, nothing more! But this method was abandoned after a short period. The modern consumer is dainty and particular about margarine and is always comparing it with butter. This is specially the case with Scandinavian people, eating, as they do, more than any other nation in the world: the Danes first with a yearly margarine consumption of about 22 kgs., after which come the Norwegians with about 18 kgs.[3]

The Scandinavian margarine industry, although quantitatively of less importance, qualitatively stands at a very high level, and a series of ingenious inventions both of margarine machines and of emulsifying agents for the industry—*e.g.*, the Palegaard (or Schou) Oil, is of Danish origin.[1]

Before the year 1930 most margarine factories were fitted out as described above. About this time two patents appeared dealing with the problem of continuous margarine working, one by Hildebrandt Soerensen, the other by A. Gerstenberg. Both of these machines were, at the time of their first appearance, very unsuitable, but later on became more and more improved. Some years later the Soerensen machine was presented by the firm Silkeborg Maskinfabrik as the Silkeborg Universal Worker, and the Gerstenberg machine, by Gerstenberg and Agger, as their Vacuum Complector.[5]

Soerensen's machine consisted of two vertical conical conveyors which pressed the margarine into a horizontal

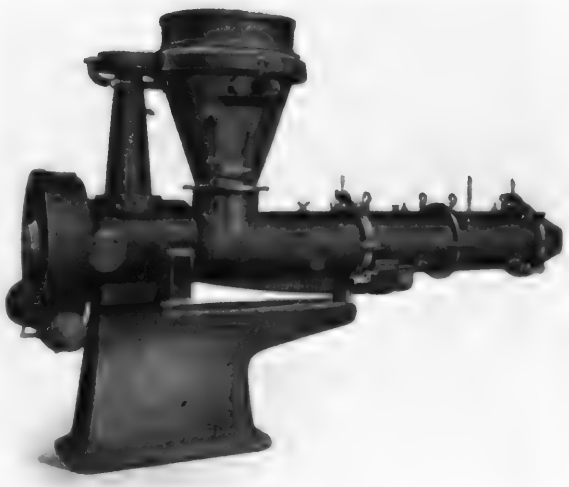
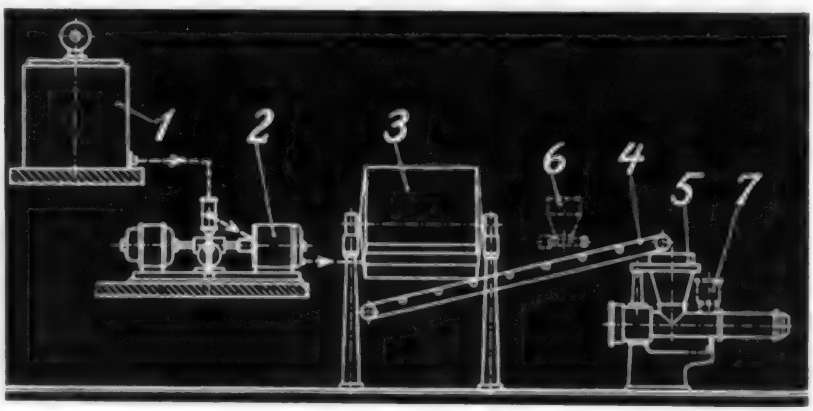


Fig. 2.—Universal Margarine Worker for continuous working.
(*Courtesy of Silkeborg*).

cylinder and from there into a pair of cylinders with dies, giving the mass a motion into a main cylinder fitted with spiral kneading wings and resistance bodies, some of them with adjustable resistance. The modern form of this machine is shown in Fig. 2.

Air Elimination

The patent by Gerstenberg deals with a machine consisting of several conveyors between which a conical crushing body is placed in such a manner that the margarine pressed forward must pass this body and so will be kneaded. The kneading effect of this machine was quite good, but a great source of dissatisfaction was the fact that all margarine that had passed through the complector afterwards became mottled in the wrapping plant. The cause was found to be the air content of the margarine, and the firm therefore connected their complector with a vacuum pump. Other improvements were found and applied—*e.g.*, an automatic and adjust-



The mass from fat and milk vessels floats to the mixing vessel (1), and from there to the emulsifier (2). The emulsion is cooled on the cooling drum (3), called Dia-Cooler, and from there the crystallised mass falls down on a belt (4), by means of which it is brought into the Universal Worker (5). If desirable, margarine can be salted on the belt when passing a salt-delivering device (6), and finally (7) be incorporated with other admixtures.

Fig. 3.

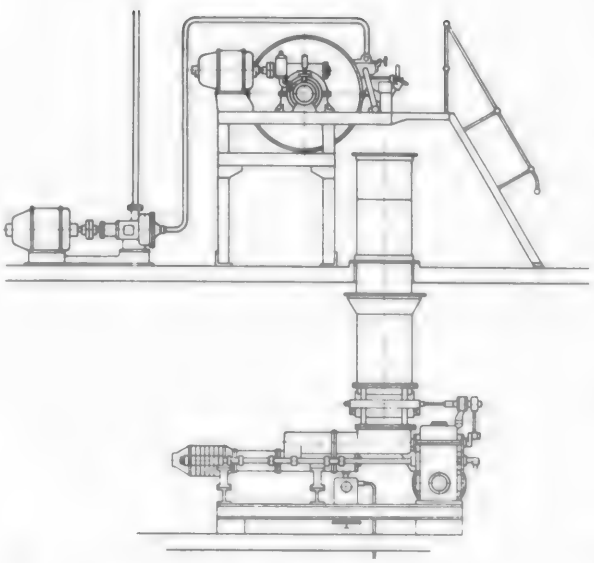


FIG. 4.—Modern vacuum complector.
(*Courtesy of Gerstenberg and Agger*).

able feeding apparatus. The modern vacuum complector will be seen in Fig. 4.

It may be mentioned that another firm, also Danish, has constructed another continuous working plant called mycronisator.

In Scandinavian margarine factories the author has seen all the above-mentioned margarine machines and also worked for a number of years with a Gerstenberg continuous plant.

In England, however, there is another continuous system, the Vogt system, recently described by Robinson,[6] but the present author has had no experience with this.

The assembling of machines in a continuously working plant is shown in Fig. 3. The mass from fat and milk vessels floats to the mixing vessel (1), and from there to the emulsifier (2). The emulsion is cooled on the cooling drum (3), called Dia-Cooler, and from there the crystallised mass falls down on a belt (4), by means of which it is brought into the Universal Worker (5). If desirable, margarine can be salted on the belt when passing a salt-delivering device (6), and finally (7) be incorporated with other admixtures.

A suitable arrangement in a modern margarine factory working with the Gerstenberg system is to have two melting vessels and one mixing vessel, and beneath them the rotor emulsifier. The cooling drum (Dia-Cooler) is placed on a platform above. The crystallised mass falls down into a huge funnel by means of which the margarine is given a certain resting period before being kneaded in the vacuum complector. When leaving the orifice of the complector the margarine is ready for use and is brought in the aluminium transport truck to the wrapping machine.

During the last few years continuous systems of margarine making have spread extensively—*e.g.*, the Gerstenberg vacuum complector now is to be found in more than forty factories in six countries and is built for capacities ranging from 600 to 7,000 kilos per hour.

Advantages Gained

The advantages gained when using modern continuous methods instead of the old ones in margarine production can be summed up in the following manner:

(1) Labour, time and space are economised.

(2) The margarine passes through the plant without being touched by hand.

(3) Due to the fact that nothing is added or abstracted, all ingredients may be mixed in right proportions even at an early stage.

(4) Plants are easy to clean and sterilise. The extensive wooden surfaces of the old plants are replaced by stainless steel or other non-corrosive material.

When using the vacuum complector, three further advantages are obtained:

(5) Due to the vacuum treatment margarine keeps its natural colour and does not become mottled when wrapped.

(6) "Complectised" margarine has a very dense structure, not slack or fibrous as an air-mixed margarine from the ordinary mixing machine.

(7) Due to this homogeneity of structure, the wrapping machine is able to be adjusted to a very little overweight, even in cases of small packs of margarine.

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[2] German Pat. No. 300835. See also Hefter-Schonfeld, p. 818.
[3] Lars Erlandsen: Margarine and Its Manufacture (Norwegian). Tekn. Ukebl., April, 1935.
[4] Lars Erlandsen: *Emulsionsole bei der technischen Margarine-Herstellung* (Emulsion Agents in Margarine Industry). To be published in *Fette und Seifen*.
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Heat Losses at the Boiler-House

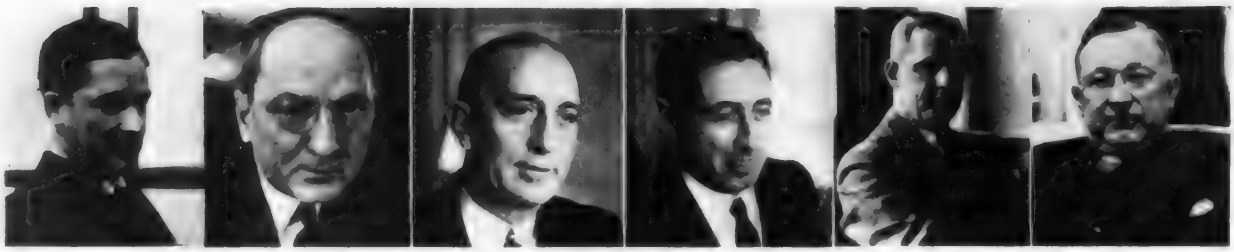
(*Continued from page* 125.)

Draught Sprinkler Stokers

In Fig. 2 are illustrated boilers fitted with patent air draught sprinkler stokers fitted to three 9 feet 9 inch diameter economic boilers, where the main air ducting is underground, immediately in front of the boilers. These stokers have self-cleaning grates, with the fire-doors closed, and have a decided advantage over hand-firing methods; two tests, one with hand-firing, and the other with mechanical stoker firing, on the same boilers show the improvement of results by adopting the latter method. Finally, the accompanying diagrams show the chief sources of loss at Lancashire and similar types of boilers, where in each case the prevention of the loss can be attained by obvious treatment.

LEADING PERSONALITIES AT THE CHICAGO CANNING CONVENTION

W. LEONARD HILL



L. Gilbert (*Dewey & Almy*) **W. H. Harrison** (*Continental Can*) **C. Gage** (*National Adhesives*) **F. Greenwald** (*National Adhesives*) **W. M. Cameron** (*Cameron Can*) **Howard Herrick** (*E. W. Bliss & Co.*)

THE CONVENTION, they say, was not quite the Brou Ha! ha! as before, but certainly this was not the fault of the interesting people who attended it. Anybody even remotely connected with canning will know Dr. Harrison, who is the shining light of the *Continental Can*, and one of whose chief preoccupations seemed to have been to make our stay pleasant and our path easy. His table at the annual dinner and dance of the Canning Machinery and Supplies Association was a centre of technical brains and feminine beauty.

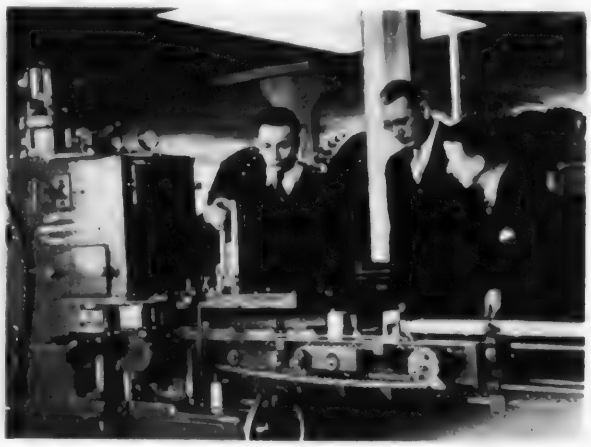
We met so many people here that it is impossible to recall them all.

There was genial F. J. O'Brien, of Continental Can, Vice-President in charge of manufacture; Mr. Conquest, keen, dark and young, in charge of laboratories; and Mr. and Mrs. Smelham. Mr. Smelham is Treasurer for Continental, and invited us to visit their Ardsley Park apartment. (Unfortunately our later appointments prevented this.) Miss Todd Hunter, D.Sc., who, incidentally, was born in the same New Zealand town as Dr. Farrow of "Metal Box"; Dr. Lilian Storms of Gerber Baby Foods, whose factory is in Freemont, Michigan, and whose latest propaganda for increasing the consumption of milk in schools is meeting with success. Mr. Thomas and Dr. Reincke of Clapp Baby Foods, also O'Connor of Continental Can, who with ourselves did a little of that inevitable chorus making when the band had tired, and a host of others.

Among those names vividly remembered are Dr. Walter H. Eddy, a professor of Columbia, head of "Good Housekeeping" Bureau (whose seal of approval appears on all the best products), and who, in addition to this, is consultant for United Fruits, an organisation which, we believe, is associated with our own Elders and Fyfes: Dr. Hartlieb, Treasurer and Vice-President for Continental Can, and, of course, Miss Ruth Attwater, who, like Dr. Harrison, is well known on this side of the Atlantic, and whose work in the Home Economics Division of the National Canners Association in America our Miss Janet Bond is so worthily emulating.

Then there was Ward Cosgrove, who is the man who put the Big Pea on the market at a time when the market would only look at tiny peas. His big advertising campaign featured "The Great Big Tender Pea", and he got away with it.

"Sonny-boy", whose real name is Schwanner, and



Mr. Haase and Mr. Hill inspecting plant of Cameron Can Machinery Co.

whose firm is F. M. Ball and Co., of Auckland, California, and his charming wife proved wonderful host and hostess at the *Chez Parée*, and Morton Berle the entertainer more than amused everybody.

Mr. Schwanner introduced us to Carl Lonegrin of Hunt Bros., Food Packers in California, and also to Morton Steinhart, who is responsible for Otoe Food Products from Nebraska. Another friend of Schwanner's whom we met was Gordon du Barry of the American Institute of Food Distributors.

In the American Food publishing world we received a warm welcome from Dr. Burton of *Food Industries*, Mrs. Poor of *The Canner* and her associates, and Mr. Nelson Budd of *The Canning Age*.

Mr. T. T. Miller of Dewey and Almy extracted an easy promise from us to look in at Cambridge, Mass., and here we found our old friend Larry Gilbert preparing to conquer Australia and Japan. We joined him in a little demonstration of the Cry-o-vac process, which is one in which a chicken (or other product) is placed in a rubber bag. The bag is first expanded, the chicken inserted, and the vacuum is created by immersion in warm water, which ensures a skin-tight fit.

There followed an interesting tour round Dewey and Almey's place, and a meeting with Gordon Gott in his new laboratory, from which is to be expected further new developments.

Mr. Shanklin gave a party for Gilbert, which was very enjoyable, not only because American parties *are* enjoyable, but also because of meeting more of Dewey and Almey's technicians.

In the experimental kitchen we had our first sight of America's latest development, "Flash Cooking". This is known as "Stero-vac", and its aim is to cut down process periods to as little as 30 seconds by using high pressure steam. To get this into contact with the food in cans is effected by having a hole in the can and to force superheated high pressure steam right into the product. There is no doubt that more will be heard of this process.

We received such kindness from so many friends that it seems invidious to mention any, but our grateful thanks are due in a special manner to our hosts and hostesses, Miss Attwater, Dr. Harrison, Chester Gage of National Adhesives, T. T. Miller of Dewey and Almy, Miss Burgess of Chicago (our globe-trotting friend from India), Mr. Howard U. Herrick of the E. W. Bliss Co., and Mr. Schwanner. Last but not least Mr. Gorell, Secretary of the Convention and Miss Tate, his versatile assistant, all of whom we hope to meet again next year.

Wrigley Building, Chicago, and Commemoration Monument, seen from Michigan Avenue.

Leonard Hill broadcasts from Station W.L.S., Chicago.

Maurice Batchelor inspects the earliest labelling machine.

RESEARCH WORK DISCUSSED AT CHICAGO CANNING CONVENTION

PROCESSING STUDIES — HEAT PENETRATION
INOCULATION TESTS — SPOILAGE RESULTS

ENTITLED "What has been going on in the laboratory in the past year", and of interest to all canning chemists, was an address given by E. J. Cameron, of the Research Laboratories, National Canners Association, before the Meat Section of the Association in Convention at Chicago on January 26 last.

It was some years ago since the laboratory undertook certain processing studies on canned meats, the results of which were reported to meat canning members of the Association. This work was rather extensive, but it was necessary to discontinue it in the early depression years. It was, however, renewed during the latter half of 1938.

Dr. Yesair's Work

Dr. Cameron's report dealt with the work carried out by Dr. Yesair. The object of the processing studies was to reach a conclusion concerning times and temperatures which would ensure safe processes. There was a collateral object in attempting by such means to promote uniformity in processing practice. Such work has been under way for many years, largely in the field of non-acid canned vegetables, seafoods and the like. It is felt that with regard to many products, principally vegetables, effectual standardisation of processing procedure has been accomplished.

In conducting processing studies, various lines of attack are utilised. First, it is necessary to know something about the nature of the organisms which must be destroyed in order to prevent spoilage. Then it is necessary to obtain a working idea about the resistance of these bacteria while in the spore stage. This calls for resistance determinations in a substrate made from the product and also in the basic substrate, which is a phosphate mixture at a pH approximately 7·0. By comparing the resistance in the food with that in phosphate we arrive at a so-called "food factor".

Heat Penetration

Heat penetration tests are made for the various products to be studied. When this data is forthcoming the food factor may be applied and by calculations suggestive processes are determined. These calculated processes are used in the formulation of a restricted range of trial processes, and then a small trial run is made. Subsequently the larger packs are put up covering the process range suggested by results of the trial run.

This, in substance, is the procedure which is followed, although there are instances where special circumstances suggest the need for modification and different investigators may emphasise one or another line of attack.

Dr. Cameron then passed on to a discussion of the preliminary meat processing studies in 1938. The four products first selected for "range finding" packs were—brains with gravy, veal loaf, "chili con carne" with beans, and lunch tongue. Samples of these products as prepared by different canners were obtained and preliminary inoculation tests were made. This was to determine the suitability of the test organism which had been selected. The organism was a putrefactive anaerobe (Off. No. 3,679) which has been used extensively in experimental pack work, and which is believed to be typical of a group which may cause spoilage in canned meats where the process is inadequate.

Inoculation Tests

Inoculation tests demonstrated that quick and complete growth by the test organism could be depended upon in the products veal loaf and "chili con carne". Previous experiments in inoculation tests in brains with gravy had demonstrated good growth, and this product was not tested at the time. It was found later on, however, that it should have been included. In lunch tongue growth and spoilage occurred only after incubation periods ranging from 6 to 30 days. This result was, of course, suggestive that there were some inhibitive materials in the tongue, presumably from curing ingredients. Incidentally, the time of incubation necessary to promote growth varied in the products obtained from different sources. The lowest time was 6 to 9 days; the intermediate was 12 to 14 days; and the highest 30 days. This probably reflects a difference in manufacturing procedure and gives some testimony to the point that such processes as may be advised in the future may provide different degrees of sterilisation. However, of practical necessity, it will be necessary to specify a general process and one which will satisfy the requirements of the product most difficult to sterilise.

Experimental inoculated packs were put up in November, and in this work Dr. Yesair had the valued assistance of members of the research staffs of Wilson and Company and the Continental Can Company. The organism No. 3,679 was used throughout, but inoculation was done in different ways, depending upon the

nature of the product. In the case of the lunch tongue, spores were injected by means of a syringe at a point near the root of the tongue as near the surface as possible. Thus, when the tongue was placed in the cans the inoculum was at the approximate centre. The different lots were exhausted by heat or were vacuum closed.

The products were shipped to the Washington laboratory and were placed under incubation at 98° F. for a period of 49 days, with the exception that a few cans were cultured from time to time.

Spoilage Results

Clean-cut spoilage results were obtained for the products veal loaf and "chili con carne" with beans, and the results with these products can undoubtedly be used to indicate process ranges for the larger packs which it is hoped can be put up during this year. With the lunch tongue no spoilage at all occurred, even in the lowest process of 50 minutes at 240° F. This result, when taken with the delayed positive results on the product in preliminary tests, gives further indication that where a product carries with it some agent of inhibition, this inhibitory substance is most effective with regard to spores of highest resistance.

In the absence of spoilage in the lunch tongue lots, it became necessary to undertake the time-consuming and difficult procedure of culturing the individual cans and depending upon the results of culture tests to indicate the level of survival of the test spores. By this means a satisfactory range of survival was determined, and a lunch tongue pack may be included in the work for this year.

No spoilage at all was found in the brains with gravy pack. This was unexpected, because of earlier experience with the product in which spoilage occurred in the manner which was expected. Culture tests on the small pack have thus far been negative, and it appears that the test organism was actually destroyed at a relatively low process. Under the circumstances any larger pack must be delayed until such time as there is opportunity for special study with the product, to determine if possible the reason of the quick destruction of the test organism in this instance.

Harking back to the brief description of procedure followed in process investigations, Dr. Cameron had a few words to say about the heat resistance determinations. These were made after the range-finding pack had been put up. Unprocessed, iced materials were brought from Chicago to Washington for the purpose. The resistance results in the meat products, as compared with resistance in phosphate, indicated food factors ranging from 1·33 in "chili con carne" with beans to 2·03 in veal loaf. These results taken with the heat penetration data will be used in calculations to determine the process ranges for the larger packs.

During this year it is hoped that it will be possible to put up the larger packs of veal loaf, lunch tongue, and "chili con carne" with beans, and in addition to this to conduct special studies on brains with gravy to determine if possible the reason for difference in behaviour of the test organism in different lots of the product. Further it is hoped to proceed with the penetration of additional "range-finding" packs similar in plan to those which have been described. Information of this type does not come quickly, but it is cumulative and the experience gained with respect to individual products is suggestive and helpful with regard to other products of the same general classification.

Correspondence

The Soya Bean

DEAR SIR,

We have enjoyed reading your interesting publication and took particular recognition of the article entitled "The Soya Bean" which appeared in your February, 1939, issue.

However, there are one or two details of the article that we feel to be somewhat misleading to your readers. One of these concerns the implication that inoculating soya beans is expensive. We have particular reference to the statement on page 60 reading, "Initial crops, even if successful, will prove expensive, partly because the field soil must be inoculated". This statement continues in another misleading point with the statement that "a 'field' is not permanently inoculated with soya nodule bacteria until after the second crop".

Millions of bushels of soya beans are now being inoculated annually in the United States, and you will note from the enclosed dealer price schedule that the purchaser can obtain high quality commercial inoculants at a cost of only 30 cents for one bushel, which is sufficient to plant an acre, and the cost ranges down to as low as 8 cents a bushel if the larger size units of inoculator are purchased.

Best technical authority in this country refutes the idea that any legume field can become permanently inoculated. It is true the proper bacteria may remain in the field after an inoculated crop has been grown, but there is such a wide variance in the effectiveness of the field bacteria that they all strongly urge that each succeeding planting be re-inoculated, particularly in view of the extremely low cost.

Another statement appearing on the same page is that the U.S. Department of Agriculture supplies growers with free cultures. This statement should have been qualified because the Department furnishes only sufficient for one bushel of seed for a crop to any one grower, and this is merely for experimental purposes. We, along with a few other commercial manufacturers, might be said to take care of the entire inoculator requirements of this country, on a commercial basis, and *Nodogen* cultures alone are used on many millions of pounds of seeds annually.

We are taking the liberty of enclosing a booklet describing the product more thoroughly, because the subject seems to be new in your country, whereas the practice of inoculating legumes is well established both here and in Canada, and practically every merchant selling seed also carries a complete line of commercial cultures for inoculating the various legume crops.

Yours very truly,

THE ALBERT DICKINSON COMPANY,

L. T. PARR,

CHICAGO. Inoculator Division.

VISCOUNT LYMINGTON DISCUSSES

"BRITISH AGRICULTURE"

To the Editor.

SIR,

I was interested to read your reviewer's opinion of Lord Astor's and Mr. Seebohm Rowntree's book. While I do not propose to comment on that review, I think it would not be without interest to examine some aspects of the book from a fresh angle.

The worst one can say of the book is that it smacks deplorably of Chatham House and P.E.P.; the best, that it is an honest, compendious and painstaking enquiry very much on the lines of a Royal Commission. To the student of statistics it is invaluable. But to the student who is looking for something more than an enquiry into things as they are, with recommendations based almost entirely on things as they are, it is full of dangerous stuff. It is dangerous in the sense that agriculture is treated with what I can only describe as a purely urban philosophy.

There are many shrewd observations and deeply interesting points, but one is left with the feeling that it has been the bookish and kindly townsman's effort to help. It has not got the deeper understanding or the wider vision that the future of civilisation depends upon two things: right and reverent use of the soil, and a large and flourishing rural population.

Defence Outlook

Let us take some instances. The whole of the outlook on defence seems to me to be based on the kind of statistics with which the Board of Trade like to comfort themselves over our lack of self-sufficiency. We are losing the carrying trade of the world, while we are keeping our markets open for imports. We have more imports and less ships; and so the argument that agricultural increase in this country would reduce our merchant shipping would hardly carry weight if we pursued a vigorous policy such as the United States and Italy have done in increasing our merchant shipping to carry our own goods.

Improvement of Yields

Toward the end of the book there are arguments showing that yields might be enormously improved. If this is true, then the cereal crops in this country could quite easily feed our own livestock in wartime. Therefore, it only helps foreign investors to accept things as they are.

There is a similar argument which says that if we start seriously to become self-sufficient in food, we must break up the whole of our export system, because other countries require the steel rails and other products of heavy industry which home agriculture would not require. It seems an extraordinary thing to upset agriculture merely because we might have to alter some of our systems of manufacturing.

Factories v. Farms

Factories can be altered far more easily than farms and the alteration need not necessarily produce any great harm; it might indeed produce a great deal of good. But radically to alter systems of farming without slow and careful forethought, testing at every step the effect on the soil and on human health, is the most dangerous policy that can be adopted. Moreover, the argument about heavy industry is entirely vitiated by the fact that heavy industry is kept going by the most iniquitous system of foreign investment, which is piling up debt and causing unemployment and misery throughout the world. It has not ever been dependent to any large extent on an exchange of goods and services between different countries.

Humus

One looks to such a book for some acknowledgment of the truths which we are discovering that the health of human beings is bound up with the health of the soil. I looked in the index for the word "humus" and found it on one page only, and then in connection with some new kind of wheat that might restore humus to the devitalized and exploited soils of North America. How this was going to take place was not mentioned! But an omission of the subject of humus in a farming book shows very clearly the urban mind. We cannot go on for ever devitalising our soils and expect to have health, or in the end, even enough food.

I looked again in the index to see if I had been mistaken and overlooked any reference to the disposal of town waste and sewage for agricultural purposes. Of this also I could find no mention. It is impossible to imagine that we can for ever go on consuming the organic products of the land in large towns and destroying the organic wastes while hoping to keep land in heart. The work of such men as Sir Albert Howard and Dr. Pfeiffer is passed over without any reference. These men have gone far to show that agriculture, in order to continue in a healthy state, must have a soil with plenty of humus properly decomposed, and that food from such well-farmed land makes all the difference to the incidence of disease and the general tone of health.

Forcing of Growth

Moreover, we are beginning to realise that as animals cannot be forced indefinitely for yield and early maturity, nor can soil. There is no doubt a theoretic maximum of what might be produced, but in practice you can only produce out of the soil what is put into it in the way of organic life. Merely to quote individual high yield means little or nothing, even when that yield takes place off very ordinary land. The effect of the continuous use of artificial manure to make good that yield has got to be taken over a long series of years. The increase in disease and the appearance of a new disease has got to be accounted for in all forms of farming, not so much as something to be overcome with sprays and medicines, but as a warning that the system of farming is dangerously off the lines.

Finally, one comes to the fact that no mention is made that all trade and progress must be based on the balance between the primary producer from sea and soil and the rest of industry. The rewards are not there for the farmer, and he will either remove the capital from the land in the shape of fertility and neglect of drains and buildings, or he will remove it in the shape of human skill and man-power. And what is more he cannot, and never will, be a customer for the man in the towns as he should be.

Lack of balance in the rewards between land and industry spells unemployment in industry, and on the land. Ultimately it means famine, both from lack of labour and lack of food—famine that will be universal. No system can continue unless it takes this into consideration, and unless with that in view it attacks the financial end and conforms to the truth that as primary production is increased so must currency be increased to make those products available to the consumer in town and country.

Yours, etc.,
LYMINGTON.

NEWS FROM THE INDUSTRY

INSTRUMENTS FOR USE IN THE BOILER-HOUSE

Considerable savings can be effected by the use of instruments in food processing and manufacture, particularly in the boiler-house.

For such boiler plants there is a need for instruments of many types for the supervision and control of all the operations, irrespective of whether the primary source of heat is coal, oil, gas or electricity. In the case of fuel-fired boilers there must be, of course, the necessary instruments which are associated with any boiler installation, such as Flue Gas Analysis Equipment, Temperature Indicators, Draught Gauges, Flowmeters, etc.

The most important measurement from the point of view of operating efficiency and economy is probably the CO_2 content of the flue gases.

The CO_2 meter will immediately detect excess air admitted to the fire and will enable the stoker accordingly to cut down the admission of air. Flue gas temperature indicators, draught gauges, inlet and outlet water temperature recorders, etc., all enable the engineer to supervise the correct and economical functioning of the various parts of his heating plant.

In addition to the CO_2 equipment manufactured by Elliott Brothers, they also supply a Float-type Steam Flowmeter for use in boiler-houses and food processing generally. This instrument works on the mercury manometer principle and is suitable for measuring the flow of steam, etc., such as is used in various food preparation processes. It can be supplied for Indicating, Recording and Integrating, with distant transmission of the readings, if desired. Suitable for working pressures up to 1,000 lbs. per sq. inch.

The following extract from actual experience illustrates the practical utility of steam metering in connection with the manufacture of foodstuffs.

"In one department of a large industrial concern, steam-heated process tanks were continuously supplied with steam throughout the entire 24 hours of the day—the tanks being in use during the day and the compound in the tanks being kept in a liquid condition at night. By means of steam meters and temperature recorders, tests were carried out and it was found that satisfactory conditions could be maintained by shutting off the steam for 3 or 4 hours during the night, thereby obtaining a 25 per cent. saving in steam consumption."

Elliott Brothers also make electrical distance thermometers, temperature recorders, thermo-electric pyrometers, automatic regulators, gas analysis equipment for food storage and refrigeration, etc. All these instruments have many applications in connection with food manufacture both in the boiler house and elsewhere.

* * *

Weighing and Packing

Many firms with expanding sales for packed goods have to extend their existing plant in order to cope with output, and Arwood Tea Company, Portadown, have installed recently a new weighing machine capable of weighing 1,000 packets of tea or cereals per hour. The machine is made by the Automatic Weighing and Packing Machine Co., of Birmingham, and ensures perfect cleanliness, weighing and packing. The machine is the first of its type to be installed in the Six Counties.

* * *

American Bakery Sales Association

The Board of Directors of the Bakery Sales Association has decided upon the Drake Hotel as headquarters for the Annual Convention which will be held in Chicago, Illinois, on May 1 and 2 next.

It is expected that there will be several hundred attending the convention.

* * *

A Useful Booklet on Fans

Sturtevant Engineering Co., Ltd., of 147, Queen Victoria Street, E.C. 4, have issued a well-produced booklet describing their "Monogram" and other Cast Iron Fans.

Monogram fans are well known, and are particularly useful in the smaller plants for dust exhausting and for drying, besides many other applications.

Among the larger types are gas fans for coke oven installations.

The Sturtevant Company have an expert engineering staff at the disposal of their clients, and are always happy to advise them as to the type of apparatus best suited to their purpose.

Vegetable Oil Pre-Heating Vessels

Founded in the year 1825, Fraser and Fraser, Ltd., have for more than 100 years been engaged on the manufacture of high-class steel plate work. In recent years they have specialised in the manufacture of the water-tube boiler, and Fraser plant has been installed in many food factories.

In addition to the water-tube boiler, their products include steam separators and vegetable oil preheating vessels. The former are tested by hydraulic pressure to 180 lbs. per sq. in. Mounted on stand with ball-bearing feet to facilitate movement of vessel due to pipe expansion. The vegetable oil preheating vessel, 5 ft. diameter by 13 ft. long by 18 ft. overall length, is constructed of ½-in. plate for a working pressure of 150 lbs. per sq. in. The pump mounted inside the base of the vessel is directly driven by the electric motor mounted on top of the vessel.

Among other plant manufactured by Fraser and Fraser, Ltd., are retorts, open-top circular pans (for the boiling of sugar), and pans in stainless steel for the heating of acids, fruit juices, etc., and many other important items.

* * *

War on Dust

In an issue devoted to Fuel and Power it is suitable to mention the comprehensive catalogue of Filters which we have received from C. G. Vokes, Ltd. This firm is engaged upon a ruthless war against dust, and if it is true that without dust there would be no sunsets, sunsets would disappear if Vokes' won the day. Manufacturers, especially those connected with the food industry, are well aware of the essential value of efficient atmospheric purification, and Vokes' plant is installed in many well-known food factories, biscuit factories, breweries and creameries, and are also employed in the manufacture of ice.

Vokes' Protectovent, easy and inexpensive to install and maintain, cutting the cost of the ravages caused by dust (which is 70 per cent. silica, the hardest abrasive known), is designed to provide dust-free air to individual rooms, while the Multi-V filter has been produced to meet the demand for an inexpensive yet efficient dry type air filter for all kinds of ventilating service.

Among other important items figuring in the catalogue are industrial air filters, dust recovery filters, dry fabric filters, and lubricating fuel and oil filters of many types and for many uses.

These filters are characterised by high efficiency and low maintenance cost, and the company welcomes enquiries on filtration problems.

Vokes' filters have easy cleaning accessibility, as in some cases this can be done with an ordinary domestic vacuum cleaner, while others are self-cleaning and need no attention.

* * *

Bournville Personalities

Cadburys' latest brochure deals with some of their staff and factory personalities, and should prove an interesting sales venture, familiarising the buyer with the production of the confectionery.

Many Bournville activities are annotated, and an idea of the inner activities of the factory is furnished.

The food manufacturer would be more particularly interested in views of canning plant, testing-rooms, and sweet moulding. Mr. Guthrie and twenty-two other qualified chemists are busy every day, testing in the Bournville laboratory, and in the Chemists' Department everything that the factory uses is tested for purity and quality. Milk and churns are subject to the most rigorous tests.

The brochure emphasises the veracity of the claims made for the quality of Bournville products, and the excellent arrangements made for the welfare of the staff.

A "Five-Year Plan"

Working to a plan which, he stated, has been brought to success largely by the loyal co-operation of every member of the staff, Mr. J. Valentine Backes celebrated on Saturday, February 11, the conclusion of five years' service as general manager to Messrs. Ch. Goldrei, Foucard and Son.

The occasion was marked by a dinner given by Mr. Ch. Goldrei to his executive and representative staff, which was held at the Howard Hotel, Norfolk Street, W.C. 2. Mr. Goldrei occupied the chair, and, alluding to the successful growth of the business, paid tribute to the enthusiasm and hard work of Mr. Backes, which had made this possible.

Mr. J. J. Blackburn, who seconded the toast (representing the sales staff) on behalf of the entire company, presented Mr. Backes with a gold cigarette-case suitably inscribed, Mr. Goldrei having previously presented Mrs. Backes with a handbag, as an acknowledgment of the fact that a man's success depends on his wife's encouragement.

Addresses were also made by members of the office and factory staff, and in expressing his thanks Mr. Backes said that while the General may have been given the medal, the one which had been given to him had been won by the loyalty and goodwill of all.

The toast of the Chairman was proposed by Mr. R. B. Harris, general manager of Messrs. Thos. Hedley and Co., Ltd. (Shortening Dept.), who, expressing his appreciation of the invitation extended to him, was of opinion that with the continuance of the co-operation that existed between his firm and that of Messrs. Ch. Goldrei, Foucard and Son success was assured.

Mr. J. Valentine Backes

Induced Draught Fan

The induced draught fan with inlet scroll dust collector developed by James Howden and Company (Land), Ltd., has many advantages. The dust is extracted from the gases before they enter the fan proper, and the problem of abrasion of the fan wheel is therefore eliminated.

The separation of the dust from the gases takes place in two stages. In the primary stage the dust is thrown to the periphery of the inlet scroll, which is provided with slots at several points around the periphery where the gases have the highest concentration of dust. Through these slots the highly dust-laden gases are led by convenient ducting to a secondary vortex cell in which the dust is precipitated. The cleaned gases are then returned from the secondary vortex cell, through ducting, to the centre of the inlet scroll, from whence they enter the fan impeller.

It will be appreciated that the static pressure at the periphery of the inlet scroll is higher than that at the inlet eye to the fan impeller. It is by using this pressure difference that the diversion of a small portion of the gases can take place.

The increase in power consumption due to the fitting of the dust collector with the inlet scroll of the fan is only moderate, as the volume passed through the secondary cell is relatively small.

The arrangement of the unit is very compact, and the power requirements very much less than if the whole of the flue gas volume were to pass through the dust-collecting equipment placed in series with the fan. It will be found that the efficiency of dust extraction will comply with the requirements of public authorities. A Howden scroll type dust-collector induced draught fan of this type is installed in the factory of Messrs. Crosse and Blackwell, Ltd., which is described elsewhere in this issue.

* * *

Drive Catalogue

A new catalogue of stock V-rope drives has been issued by Crofts (Engineers), Ltd. In it the tables have been handily arranged to enable stock drives and their prices to be selected in the minimum of time. The drives listed are claimed to cover the needs of all normal drives and 95 per cent. of general industrial applications.

Cements for Furnaces

Wherever furnaces of all types, or any brickwork or metal which is exposed to heat, have to be jointed or repaired, the standard cements for the purpose are Purimachos and Drykos.

Purimachos is a plastic cement, and when exposed to heat it sets stone hard. In setting it expands slightly, thus ensuring perfectly firm gas- and smoke-tight joints. It grips metal and brick surfaces tenaciously, and never cracks or crumbles. Used for binding firebrick-work, Purimachos forms joints as strong and lasting as the firebricks themselves. Purimachos is suitable for all pressures and most temperatures. Used as a wash it protects the face of firebrick-work and counteracts the adherence of slag.

For extreme temperatures Drykos Powder Cement should be used. This is made in several grades to suit all conditions. In contrast with fireclay, Drykos has all the impurities, usually found in this material, eliminated as far as possible in manufacture. It has great bonding powers.

In addition to these two fire cements, Purimachos, Ltd., make special fire cements to suit any particular purposes, and at all times they are pleased to advise on and supply the most suitable jointing material for any requirement.

Working samples of Purimachos and Drykos will be supplied on request to Purimachos, Ltd., St. Philip's, Bristol.

* * *

98·8 per cent. Pure Salt

Charles Moore and Co., Ltd., are placing on the market a new product in the form of Lymm Pure Salt, which is vacuum-dried and guaranteed to contain 98·8 per cent. sodium chloride in dry sample. The guarantee, printed on the miniature sacks, in which samples were put up, declares that the salt contains no sulphate of lime, sulphate of magnesia, chloride of magnesia, chloride of barium, sulphate of soda or any adulterant.

Of the 900,000 tons of salt consumed annually in this country about 10 per cent. is vacuum-dried, and Moore and Co. look to the chemical industries, which demand the highest possible degree of purity in the salt used, to provide a considerable outlet for their production. Uses for pure salt include treatment of Addison's disease, filling and bulking tablets and cleansing gelatine capsules. This salt will have a considerable application in the food industry, and it is not improbable that the table-salt market will be investigated.

Pooling Industrial A.R.P. Knowledge

From E. K. Cole, Ltd., comes the suggestion that industrial A.R.P. knowledge should be pooled, and that in the preparation for a time of emergency, when the continuance of industrial production would be more than ever essential, co-operative effort should be obtained.

They have themselves constructed shelters to accommodate 3,000 employees. These shelters are timber-lined throughout, equipped with electric light, emergency generator, telephones, radio, first-aid bays, drainage sumps, etc., and have been highly commended by A.R.P. experts.

The firm stresses the point that they are seeking information as much as offering it, and it is this spirit of co-operation, which has already been shown by other manufacturers, which has encouraged them to make a general appeal for exchange of information.

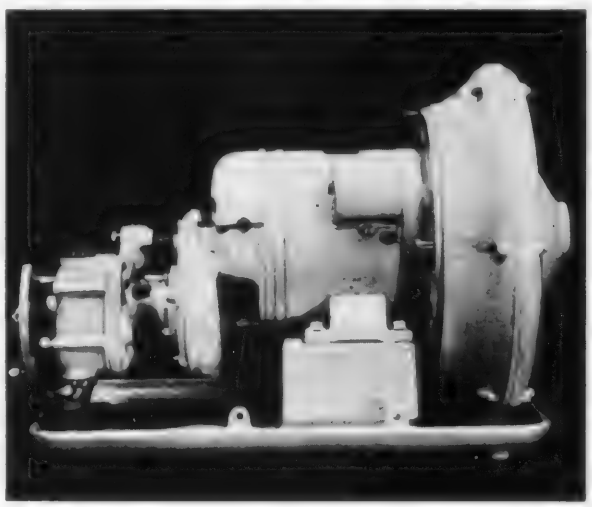
I.C.I. Dyestuffs Group—New Appointments

Following upon the I.C.I. reorganisation which was announced on March 1, 1938, the following appointments have been made to the I.C.I. Dyestuffs Group Board as from January 1, 1939. The headquarters of the Group are at Hexagon House, Blackley: Chairman—C. J. T. Cronshaw; Managing Delegate Director—T. M. Willcox; Delegate Director—W. F. Lutyens.

Dr. C. J. T. Cronshaw thus succeeds Mr. Francis Walker as Chairman of the Group, and Mr. T. M. Willcox follows Dr. Cronshaw as Managing Director. Mr. T. M. Willcox was Manager of the North-Western Divisional Sales Office at Ship Canal House, Manchester, and his place has been taken by Mr. P. A. Smith.

* * *

"Hydra" Liquid Fuel Oil Burners



These burners are suitable for practically any type of process work, and can be electrically controlled within very fine limits of temperature—*i.e.*, paint and varnish boiling, continuous kilns, central heating and, in fact, wherever an inexpensive and easily controlled source of instantly available heat is required.

Two well-known and successful liquid fuel burners, electrically driven, are the "Standard" and "Major" Hydra Burners, capacities, of the former, being 1 to 5 gallons of oil per hour and, the latter, 5 to 10 gallons of oil per hour (130,000 B.T.U.'s equal 1 gallon).

A new development takes the form of the new "Magna" Burner Head, this model being introduced to cater for an independent air feed when it is a necessity for larger fuel consumption up to 25 gallons of oil per hour.

There is a very brisk demand for each one of these types, because it is becoming appreciated more and more that the "Hydra" method of atomisation by rotation of the cup and the variable stroke metering pump—acting as a fuel supply pump with its micro-metering device for controlling the flow of fuel in place of needle valves, etc.—are the most important features in the burning of liquid fuels.

Proof of these statements is evidenced by the ease with which it is possible to burn, without special preparation, the heaviest fuel oils, many liquids, amongst them used engine oil and wastes of all sorts which have previously had more nuisance value than usefulness.

Economy in Cost and Labour

The boiler which we illustrate has been installed by Marshall, Sons and Company (Successors), Ltd., in the factory of the Metal Box Co., Ltd., and is of the locomotive smoketube type 21 feet 10 inches by 5 feet 6 inches diameter barrel, with a splayed firebox. It is fitted with 123 3-inch solid drawn tubes 11 feet 1 inch long, and the heating surface is 1,150 square feet. The boiler is capable of an output of 6,000,000 B.T.U.'s per hour, and suitable for 80 lbs. per square inch working pressure. Hot water flows through a 6-inch connection at the top at about 140° F., but this varies according to the climatic conditions. The return water is taken into the lower part of the boiler at three separate points, so as to reduce expansion and contraction stresses at any particular point.

It is fitted with a Hope's mechanical underfeed type of furnace, at 4 feet 6 inches below floor level, and this furnace is so designed as to ensure adequate combustion, thus eliminating all smoke, which is most important as the factory of the Metal Box Co., Ltd., is situated in a residential district.

Controls are fully automatic, and the temperature in the various sections of the factory can be kept constantly to the desired degree with the minimum of trouble.

The fuel is bituminous single "Kynscote" washed peas, costing approximately 33s. per ton delivered.

The boiler is used day and night during the whole of the winter months, and the quantity of coal burned during very cold weather is approximately 18 tons per week. The hopper in connection with the stoker has only to be filled once in five hours on the coldest day. There is a forced-air draught fan arrangement so as to ensure correct combustion under all conditions of working.

The arrangement of the boiler and hot-water system was designed by Hope's Heating and Lighting Company.

* * *

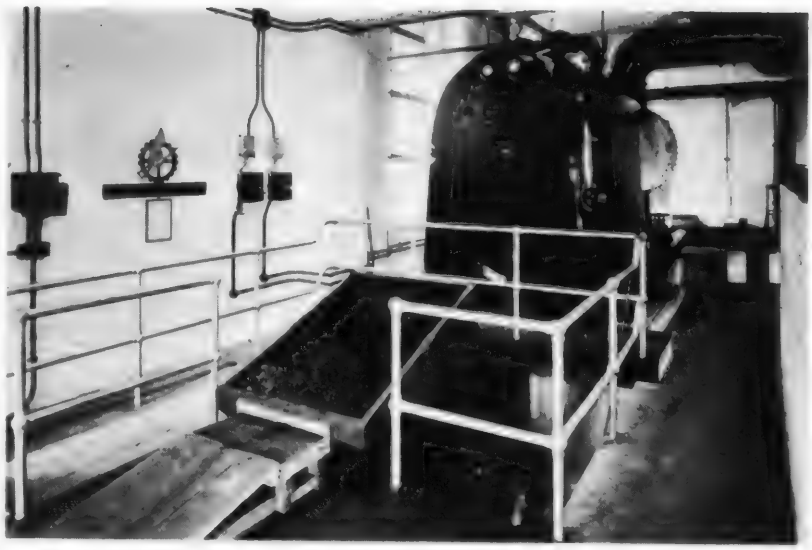
Cunarder

The new *Queen Elizabeth* liner will have for her engine-room and boiler-house temperatures, mercury-in-steel dial thermometers and thermocouple pyrometers supplied by Negretti and Zambra. The *Queen Mary* uses similar instruments.

* * *

Sugar Smuggling Problem

Sugar smuggling in the Far East has become a problem. Between Shanghai and Ningpo in China about 40,000 bags escape Customs duty each month.



Extensions at a Confectionery Factory

The tonnage output of the confectionery factory of W. H. Dunn and Co., Ltd., established at Burn Park Works, Sunderland, in 1928, has increased by over 200 per cent. during ten years of operation.

Such an increase has necessitated many extensions to equipment, the latest being the installation of additional switchgear and a transformer.

The whole of the factory is supplied by two transformers. That recently added, manufactured by the British Electric Transformer Co., Ltd., is rated 450 kVA and operates from 5,000 to 400 volts, 3-phase. The one used singly, prior to extensions, is a 250 kVA transformer working from 5,000 to 220 volts, 3-phase.

A Crompton Parkinson 2-panel M.C.A. 2 300 amp. metal-clad and compound-filled switchboard controls the two transformers. The low tension supplies from both transformers are controlled by a Crompton Parkinson low tension switchboard in which the busbars are divided into two sections, one of 220 volts, the other 400 volts.

The 220 volt section of the incoming supply is controlled by an Ellison 600 amp. circuit breaker. On the 400 volt section the supply is controlled by a Crompton Parkinson 700 amp. KLAD "A" unit.

Unbalanced load Kilowatt hour meters were supplied to measure the energy consumption on each side of the factory and Power Factor meters were provided on both sets of busbars.

Pioneer steps have been taken at the factory in the production of inexpensive chocolate-coated caramels. It is the largest factory of its kind in the north-east counties, and now embodies over 2 acres of floor space.

Cameron Can Machinery Co.

It is said that business men in America are not export-minded. However this may be generally, there is certainly a very strong exception in the two brothers Cameron. *Food Industries Weekly* only a few weeks ago showed a picture of Mr. James Cameron in company with Mr. Tatton Browne of Dewey and Almy in South America. It seemed to us only a matter of months since Mr. Cameron was talking to us in London, and great was our suprise when we learned that he had been in South America for eighteen months. They take their European business very seriously also.

As our readers well know, Cameron Can have advertised in FOOD MANUFACTURE for many years without a break. They are now taking their European business more seriously than ever. The new Anglo-American Trade Pact, which will shortly be an accomplished fact, and the rather altered position in the relations between these countries, should help American manufacturers such as Cameron Can.

Of course, they were properly represented at the Canners' Convention. Mr. E. W. Miller was in charge of their exhibit. The decision this year to have no heavy machinery was probably of great assistance to Cameron Can, for they were able and in fact did run all their visitors up to the plant by a special relay of Chicago's yellow taxis. Naturally, the demonstration plant was ready and waiting—spick and span—and working without a hitch. Our pictures elsewhere show your correspondent together with Mr. Haas, and our other picture shows Mr. William Cameron in his office at the works.

Tintometer Improvements

Two modifications to their colorimeter apparatus have been made by Tintometer, Ltd., which add considerably to its precision and usefulness.

First, the Lovibond-Schofield system is accompanied by graphs which enable the instrumental readings to be converted into C.I.E. international units—a step towards standardisation of world practice which laboratory workers will welcome.

Second, by the incorporation of the Rothamsted device it is now possible to separate the relative brightnesses of the two fields of view from colour values. This device consists of an obturator vane inserted in the white-light cabinet.

A drum actuated by the knurled knob which operates the vane is calibrated in negative logarithms of brightness (visual density), reading in black figures when the illumination on the comparison field is reduced, and in red when the illumination on the sample under test is reduced.

The Lovibond Tintometer, B.D.H. pattern, has not undergone any change except that the neutral tint slides for use in front of bright samples are no longer required, and never more than two of the three series of slides—red, yellow and blue—are used in matching any colour.

The positions of all the Tintometer slides and all combinations of two slides have been found on the Colour Quality Triangle of the International C.I.E. System, but for convenience of users the conversion graph No. 1 has been plotted on the Uniform Chromaticity System of D. B. Judd, the advantage of this system being that equal distances on the graph represent an equal number of least perceptible differences, except in the saturated violet area where some distortion occurs. Any colour is adequately described by the colour quality.

When, however, it is desired to give the total brightness as described in the C.I.E. System, it is necessary to refer to graph No. 2, which gives the visual density for all combinations of the Tintometer colour slides.

To the visual density for the particular combination of Tintometer slides used in a colour match must be added or subtracted that of the drum reading, and from this total the percentage brightness can be obtained by means of logarithm tables.

* * *

Mr. L. D. Galloway, M.A.(Cantab.), has removed his practice to 10a, Featherstone Buildings, High Holborn, London, W.C.1, the laboratory of Mr. T. McLachlan, A.C.G.F.C., F.I.C., whom he will assist in his work on microbiology.

Business Tour in Africa

Alderman Edwin Thompson, J.P., Governing Director of Manesty Machines, Ltd., and Thompson and Capper Wholesale, Ltd., Speke Hall Road, Liverpool, 19, sailed recently for South Africa on a business visit.

Mr. Edwin Thompson was Lord Mayor of Liverpool in 1930-31, President of the British Waterworks Association in 1931, and President of the Society of Chemical Industry in 1935.

Mr. Thompson will visit Capetown, Johannesburg and Durban.

* * *

Hull's Oilseed Imports

Mr. Cecil H. Robson, Chairman of the Hull and District Seed Crushers Association, reports that arrivals of oilseed and nuts into Hull during 1939 represented between 40 and 45 per cent. of all the imports of this class of raw material into the United Kingdom.

Hull's position as a leading oil manufacturing centre has been strengthened by the opening of a large mill on the River Hull for the production of refined whale oil and edible products.

* * *

A New Type of Coal Meter

The Lea Recorder Co., Ltd., of Cornbrook Park Road, Manchester, 15, have just issued a booklet describing the Lea patent coal meters for screw-operated mechanical stokers—"uni-meter" type. These meters are applicable also to spiral conveyors and feeders.

The main object of the "uni-meter" mechanism is to eliminate or cut out all fractional coefficients or constants so that the meters may register directly in units of 1 cubic foot, or 1 lb. or 2 or 3 lbs. or cwts., or kilogrammes, or in any other convenient even-figured units.

When applied to Lancashire boilers the meter is located centrally between the two furnaces, with a separate chain drive from each stoker screw to the meter, and in order that the revolutions of one screw may be added to the revolutions of the other screw the meter is fitted with adding up or integrating mechanism.

This mechanism is of the same type as that used in the Lea Recorder Co., Ltd.'s standard Lancashire type Coal Meters when applied to Ram-type Stokers.

The advantages claimed are:

1. Direct reading of coal consumption in pounds, or cubic feet.
2. Constant check on coal consumed.
3. Ease of installation.

Our illustration shows a striking display sign of Messrs. Huntley and Palmers, the world-famous firm of biscuit makers, which celebrated its centenary in 1926. The sign, which is at Stonebridge Park, on the North Circular Road, consists of a 20-foot sheet-metal-faced cube, each side painted to represented one of the familiar biscuit box labels. The whole is floodlit by eight Siemens "Royston" reflectors with 1,000-watt Siemens projector lamps, two on each side. Connection with the supply mains 300 yards away is by Siemens ·0225 twin-paper insulated, lead-covered D.S.T. armoured 660-V. cable, and the installation is controlled by a synchronous wound 5-amp. time-switch in circuit with a 50-amp. contactor. The work, including the laying of cable, was carried out by London Signs and Illuminations, Ltd. The effect is distinctly striking, and the electrical firms concerned are to be congratulated on providing Messrs. Huntley and Palmers with a most original and arresting display.

* * *

Extension of Business

Owing to the extension of their business and their interest in new developments and processes which modern requirements demand in the treatment, conservation and packing of food products generally, Charles E. Douglas and Co., Ltd., 206-8, Cecil Chambers, 76-86, Strand, W.C.2, have assumed Mr. Philip Bodley Scott as a director of the company and have also engaged additional technical staff to assist in developing these processes.

On account of their wide experience and extensive modern connections, Messrs. Charles E. Douglas and Co., Ltd., are in a position to give sound advice on up-to-date methods.

INFORMATION AND ADVICE

Making Mincemeat—Preserving Strawberries—Estimation of Glucose in Jam

Making Mincemeat

4,920. *We are contemplating the production, on a small scale to start with, of marmalade and mincemeat to be packed in glass jars. We have read the information contained in the* 1934 Food Industries Manual *concerning the manufacture of marmalade, but can find nothing about mincemeat. Could you give us a basic recipe on which we could work?* (Surrey.)

Mincemeat.

No. 1.

5 lb. minced suet.
5 lb. sultanas.
5 lb. fresh apples (before paring).
5 lb. currants.
2½ lb. sugar, soft.
2 lb. macaroons.
6 oz. orange peel, minced.
6 oz. citron peel, minced.
7 oz. mixed spice.
4 glasses of sherry wine.
4 glasses of brandy.

With the exception of suet, sugar, macaroons, spice, and wines, pass all through the mincer; then mix the whole of the ingredients together on the slab. Store in wooden boxes lined with greaseproof paper. Cover well up to prevent any impurities getting at the meat and store in cool place for at least six weeks when possible.

Meat made this way will keep fresh for twelve months.

The macaroons referred to in the recipe are made from—

1 lb. ground unblanched almonds.
1 lb. sugar.
6 oz. egg whites or dissolved albumin.

Mix all together on slab. Drop on to greased and dusted baking tins in rough form with the hand. Bake well in cool oven till dry. When cold, break the macaroons with a rolling-pin, place in clean vessel, saturate with all the wine. Allow to lie overnight, when the macaroons should be quite soft.

No. 2.

3 lb. minced suet.
4½ lb. currants.
2 lb. sultanas.
1 lb. apples.
1 lb. mixed peel.
½ lb. sugar.
½ oz. ground nutmeg.
¼ oz. ground cloves.
¼ oz. ground ginger.
½ oz. ground cinnamon.
2 glasses of rum.

Preserving Strawberries

4,942. *I understand that fair quantities of strawberries packed in barrels and preserved with SO_2 (Sulphur Dioxide) are imported here from the Continent—chiefly Holland, Bulgaria, and Italy. I am wondering if you have any information regarding this process of preserving strawberries. I am informed that packers in the United States do not employ this method of preserving strawberries, but it is possible that they could do so, if they had knowledge of the process. As you may know, there is a large production of strawberries in the States along the Atlantic seaboard. The season is short and every year there are fairly substantial losses because of early deterioration.* (U.S.A.)

We published articles in FOOD MANUFACTURE on fruit pulps in July, 1933, and April, 1934. They are out of print, but photostat copies may be obtained price 2s. and 10s. respectively. Both articles make special reference to strawberry pulp. The first considers the manufacturing problem generally and the second the quantities and methods of adding sulphur dioxide, whether as gas, as sulphurous acid, as calcium bisulphite, or potassium or sodium metabisulphite.

The casks for holding the pulp are given either a coating of wax (which requires a good deal of experience) or a coating of special enamel.

Estimation of Glucose in Jam

5,024. *I should be glad if you would answer the following questions:*

(1) *Methods for the detection and estimation of apple in jams.*

(2) *Methods for the estimation of glucose in jams.* (Somerset.)

With reference to your enquiry in connection with above, we give below the method of T. Macara for calculating the proportion of glucose syrup in jam, which is given in J. E. Liverseege's book on Adulteration and Analysis of Foods and Drugs:

"It is based on the assumptions that in fruits the dextrose and lævulose are present in equal proportions; that the specific rotation (D) of the solids of glucose syrup is 140, and that reducing sugar, expressed as invert sugar, is half of them.

$$\text{Glucose solids, } \% = \frac{4K}{30} + \frac{2(J-S)}{3},$$

where K is the reducing power of the uninverted jam expressed as invert sugar, J is the specific rotation of the jam at 20° C., and S is the corresponding figure for the sucrose in it.

For details of the method of estimating apple we would refer you to *Analyst*, 1934, p. 248.

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RECENT PATENTS

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Abstracts of Recent Specifications

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume, or in bound volumes price 2s. each.

Milk Preparations; Concentrating Milk and Milk Serum

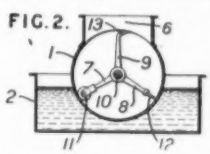
A condensed milk preparation is obtained by adding lactose in the form of a concentrated milk serum which has been concentrated at not above about 40° C. to concentrated skimmed or unskimmed milk. The milk is preferably concentrated to about 30 per cent. of its original volume, and the serum to about one-eighteenth of its original weight. The two concentrations and the mixing are preferably all effected at about 40° C. The product may be preserved in sealed tins.

495,746. Sornet, F., and Etienne, G.

Vegetable Preparations

Farinaceous vegetables, such as potatoes, after complete boiling, are dried at a temperature of about 50° C., being subjected during the drying operation to a crushing, disintegrating, scraping and stirring action.

FIG. 2.



The boiled vegetables are fed through an aperture 6 into a drum 1, which is in part immersed in water in a tank 2, this water being maintained at 50° C. A spindle 10 passes through the drum and is provided with three arms 7, 8, 9, carrying respectively a crushing roller 11, a disintegrating comb 12 and a scraper 13. The powder produced is passed through a fine-mesh silk sieve and is then subjected to a final drying for about 30 minutes. This drying may take place in a device similar to that used for the first drying, but not provided with a crushing member. The treatment may take place in a vacuum. Specification 457,088 is referred to.

496,423. Volpertas, Z.

Canning Peas

Green peas are allowed to dry and harden, preferably in the sun, to render them capable of being stored, then stored until required for canning, on which they are soaked in water for about 12 hours to soften them, washed several times in fresh water and then boiled—*e.g.*, at 230° C. for about 1½ hours—to return them to their original state and appearance and finally packed in tins. The peas may then be washed two or three times and cooled in water for a further 1½ hours, on which they may be immersed in cool sterilised salt water and packed in tins, which are then sealed and sterilised by heating to 235° to 240° F. for 1 to 1½ hours and finally cooled.

496,446. Yamamoto, S. (trading as Hong Hoe Hing Kongsi).

Flavouring and Preserving Fish

Raw fish is immersed in a bath of flavouring sauce, which is preferably at a temperature—*e.g.*, about 30° to 35° F.—well below that of the fish, and then subjected to quick freezing. Small pieces of fish may, after immersion in the flavouring bath, be assembled into a single mass, which is subjected to the quick freezing. The flavouring bath may consist of equal parts by weight of water and tomato ketchup. The freezing forms an ice film over the fish and seals the flavouring within the cells and tissues.

496,463. Boutilier, W. H., and Bryce, F. W.

Clarifying Sugar Juice

In a process for clarifying hot sugar juices by precipitation of suspended matter convection currents in the hot juices are prevented and the precipitation of the suspended matter facilitated by covering the juices with a layer of oil. The process may be carried out in the apparatus described in Specifications 491,343 and 491,346.

493,092. Mirrlees Watson Co., Ltd., and Bach, N. B.

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Copies of the comprehensive 8-page index to last year's issues are still available to subscribers, who should apply to:

The Publishers, *Food Manufacture*
17, Stratford Place, London, W. 1

Latest Patent Applications

5898. Murray Deodorisers, Ltd.: Pasteurising, etc., lacteal liquids under vacuum. February 22.
5640. Salzburg, A. A.: Production of dry starch products, etc. February 20.
5597. Dryfood, Ltd., Salzburg, A. A., and Seck, W. G.: Stem starch preparations. February 20.
5553. Ward, M.: Cereal preparations. February 20.
5484. Danish Bacon Co., Ltd., and Francis, W.: Smoking of bacon. February 18.
5167. Duffield, W. A.: Food preparations, etc. February 16.
4968. Orive, F., and Basauldo, J. R.: Process for sterilising fluid products. February 15.
4877. Potato Corporation of Idaho: Treatment of potatoes to produce dried mashed potato. February 14.
4664. Volpertas, Z.: Process for reducing vegetables containing starch to a dry powder. February 13.
4620. Kreidl, I.: Production of a sweetening agent. February 13.
4503. Lowe Food Products Co., Ltd., J., and Glaze, R. C.: Reconstituted milk. February 10.
4221. Green, A.: Manufacture of special bakers' flours, etc. February 8.
3650. Wilkin, Ltd., A. S., and Wilkin, F. W.: Wrapping up of confectionery, etc., for storage, etc. February 3.
3496. Leach, T. T.: Tab for lifting from its container, etc., the complete wrapping from any cheese, etc. February 2.
5590. Thomassen, T.: Method of coating covers, etc., for preserve tins, etc. February 20.
5589. Thomassen, T.: Cover, etc., provided with packing material for preserve tins, etc. February 20.
4612. Leetham, R. E.: Manufacture of food, etc. February 13.
4457. Crowe, G. E. W., and Coleman, C. J.: Means for indicating, etc., the pressure within vessels for cooking, etc., edible, etc., goods by fluid pressure. February 10.

Complete Specifications Accepted

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

501,010. Hesser Maschinenfabrik Akt.-Ges. F., and Schwinger, H.: Machines for dividing up slabs, for example, of sugar, and packing.
500,915. Rumsey, Jun., H.: Apparatus for the curing of meats.
500,800. McCharles, C. H., and Mulvany, H. A.: Treating egg whites to improve keeping and whipping qualities.
500,730. Triggs, W. W. (Standard Brands, Inc.): Process of and apparatus for filtering liquid egg material.
500,663. International Yeast Co., Ltd., and Bennett, W. G.: Manufacture of yeast and other micro-organisms. (Addition to 396,206.)
500,614. Hopkins, A. D., and Hopkins and Sons, Ltd., G.: Pasteurising apparatus.

NEW COMPANIES

Agricultural and Chemical Products, Ltd. (349410.) February 10. 91, Moorgate, London, E.C. 2. Dlrs. in dried vegetables, yeast, fruit juices and all varieties of agricultural and chemical products, etc. £1,000. Dirs. not named.

John Barton and Co., Ltd. (350044.) February 28. Jubilee Works, Arragon Road, East Ham, E. 6. Mnfrs., canners and preservers of and dlrs. in meat and fish pastes, meats, fish, vegetables, fruits and other foods and commodities, etc. £1,000. Dirs.: B. W. Barton, 52, Gerard Road, Barnes, S.W. 13; C. A. Ruffell, 113, Chelmsford Road, Woodford, E. 18.

Benno Partners and Products, Ltd. (349927.) February 25. 1, Featherstone Buildings, High Holborn, London, W.C. 1. To take over the bus. cd. on at Featherstone Buildings as The Benno Products Company, and to carry on the bus. of mnfrs. and of dlrs. in chocolates, confectionery, etc. £6,250. Permt. dirs.: B. H. Goldbard, 194, Hale Lane, Edgware, Middlesex; F. Lowy, Wellington House, Oathall Road, Haywards Heath.

F. J. Broughton, Ltd. (349323.) February 8. High Street Baker, High Street, Sidmouth, Devon. Bakers, caterers and confectioners, etc. £3,000. Permt. mang. dir.: F. J. Broughton, High Street, Sidmouth.

Flook and Co. (Bristol), Ltd. (348553.) January 18. Mchts. and dlrs. in fish, poultry, game, etc. £2,000. Dir.: W. Daly, Fairfield Road, Lancaster.

Hills and Desborough, Ltd. (349429.) February 10. 21, Tennyson Road, Luton. Bakers and confectioners, etc. £2,000. Permt. dirs.: P. H. Hills, 117, Wellington Street, Luton; D. Desborough, 21, Tennyson Road, Luton.

Kensington Creameries, Ltd. (349942.) February 25. To take over the bus. of dairymen and provision mchts. cd. on at 103, Lancaster Road, Ladbroke Grove, W. 11, by Rose's Direct Milk Supply (London), Ltd. £2,000. Dirs.: W. Combes, 12, Alexandra Court, Maida Vale, W. 9; W. Scott, 36, Woodcock Hill, Kenton, Harrow.

H. G. Kingham and Co., Ltd. (349634.) February 16. Wholesale and retail grocers and provision mchts. £55,000. Permt. dirs.: H. G. Kingham and H. B. P. Kingham, Brook Lodge, Blackbrook, Dorking; W. G. Kingham, Lynwood House, Effingham Common, Leatherhead; F. Wilson.

Lang Produce Company, Ltd. (349532.) February 13. 34, Gresham Street, London, E.C. 2. Genl. mchts., dlrs. and warehousemen of fresh, chilled and/or frozen produce, etc. £1,000.

A. Lee and Company (Confectionery), Ltd. (349288.) 100, The Cut, Lambeth, London, S.E. 1. Confectioners, etc. £1,000. Dirs.: L. Klackan, 57, Elmsdale Road, Walthamstow, E. 17; A. Lee, 100, The Cut, Lambeth.

Hi-Hat (Leicester), Ltd. (350197.) March 3. 190, Broad Street, Birmingham. Mnfrs. and sellers or hirers of catering equipment and utensils, mnfrs. of and dlrs. in foodstuffs, etc. £1,000. Dirs.: A. C. Aspinall, 190, Broad Street, Birmingham; W. G. Foxley, 69, Selly Wick Road, Selly Park, Birmingham.

Nunbetta Products, Ltd. (349945.) February 25. Mnfrs., packers, canners, blenders of and dlrs. in preserved, prepared, patent and other foods, food products, etc. £35,000. Permt. dirs.: F. James and Mrs. E. James, 26, Friars Road, Newport, Mon.

Overseas Raw and Manufactured Products, Ltd. (349948.) February 25. Genl. mchts., mnfrs. of and dlrs. in food and other products, chemicals, etc. £3,000. Dirs. to be appointed by the subs.

J. Rank (Newcastle), Ltd. (349525.) February 13. Flour and provender millers, grain mchts., etc. £650,000. Dirs. to be appointed by the subs.

Snack Food Products, Ltd. (349830.) February 22. Makers, preservers and packers of and dlrs. in food, cereal products, sandwiches, rolls, pies, preserved and canned meats, etc. £2,000. Permt. dirs.: J. G. Clugston, 206, Ashby Road, Scunthorpe; F. Hobson, 61, Exeter Road, Scunthorpe; W. M. Robertshaw, 134, Doncaster Road, Scunthorpe; W. Sandwith, 2, Vicarage Gardens, Scunthorpe; H. W. Spilman, 24, Brumby Wood Lane, Scunthorpe.

Mrs. J. L. Taylor, Ltd. (349345.) February 8. Confectioners and bakers. £3,000. Dirs.: Miss M. E. Ramsbottom, 848, Kingsway, East Didsbury, Manchester; W. Ramsbottom, 418, Wilbraham Road, Chorlton-cum-Hardy, Manchester.

The above-mentioned particulars of new companies recently registered have been extracted from the daily register of Messrs. Jordan and Sons, Ltd., company registration agents, Chancery Lane, W.C. 2.

TRADE MARKS

BEATRICE.—602,961. **Fresh fruits and fresh vegetables.** ELDORADO LAND AND FRUIT CO., LTD., 4b, Frederick's Place, Old Jewry, London, E.C. 2. March 8.

COURT.—B 602,929. **Evaporated apples, evaporated apricots, evaporated fruit salad, evaporated peaches, evaporated pears, evaporated plums, tinned apples, tinned apricots, tinned fruit salad, tinned grapefruit, tinned peaches, tinned pears, tinned oranges, tinned pineapple, tinned tomatoes, tinned crab, tinned salmon, tinned sardines, dried currants, prunes, raisins and sultanas.** WM. BROWN AND CO. OF LIVERPOOL, LTD., 11 and 13, Victoria Street, Liverpool. (Associated.) February 22.

DRIPPEX.—603,039. **Edible fats, but not including margarine.** BENNINGA (MITCHAM), LTD., 33, Mortimer Road, Mitcham, Surrey. (By Consent.) March 8.

ERA.—602,038. **Canned poultry.** VACUUM FOODS, LTD., 16, Eastcheap, London, E.C. 3. March 8.

Canned poultry and goods of the same description will be struck out from the goods of Registration No. 289,582 (1510) xlii if and before the applicants' mark is registered.

EXPRESS.—602,768. **Milk, cream, cheese, butter, eggs, mincemeat and mayonnaise.** EXPRESS DAIRY CO., LTD., 15/17, Tavistock Place, London, W.C. 1. (Associated.) (By Consent.) March 8.

EXPRESS DAIRY. — 602,766. **Milk, cream, cheese, butter, eggs, junket, suet, marmalade, sardines, pickles, tomato ketchup, fish pastes and meat pastes.** EXPRESS DAIRY CO., LTD., 15/17, Tavistock Place, London, W.C. 1. (Associated.) (By Consent.) March 8.

Registration of this trade mark shall give no right to the exclusive use of the word "Dairy".

GAIETY.—603,179. **Dried fruits, canned hams, canned fruits, canned vegetables and canned milk.** A. J. MILLS AND CO., LTD., Colonial House, Tooley Street, London, S.E. 1. (Associated.) March 8.

Dried fruits and goods of the same description will be struck out from the goods of Registration No. 356,115 (1865) xlii if and before the applicants' mark is registered.

GOBLIN.—586,121. **Substance used as food or as ingredients in food, but not including biscuits, cakes, dates, fish or peas, and not including any goods of the same description as any of these excluded goods.** SIMPSON READY FOODS, LTD., The Garden Factory, Stretford Road, Urmston, Manchester. (Associated.) March 8.

SENTRY BRAND.—602,964. **Chocolate, pastilles (confectionery), gums (confectionery), toffee and boiled sugar sweets.** SALE TILNEY AND CO., LTD., 3, Lloyds Avenue, London, E.C. 3. (By Consent.) February 15.

TANDEM.—603,826. **Chocolate and confectionery.** MELTIS, LTD., 158, Drummond Road, London, S.E. 16. February 22.

Chocolate and confectionery and goods of the same description will be struck out from the goods of Registration No. 152,389 (674) xlii if and before the applicants' mark is registered.

WHOOPEE.—602,548. **Biscuits, not being food for animals.** PEEK, FREAN AND CO., LTD., 158, Drummond Road, Bermondsey, London, S.E. 16. February 22.

Biscuits and goods of the same description will be struck out from the goods of Registration No. 539,713 (2871) xlii if and before the applicants' mark is registered.

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